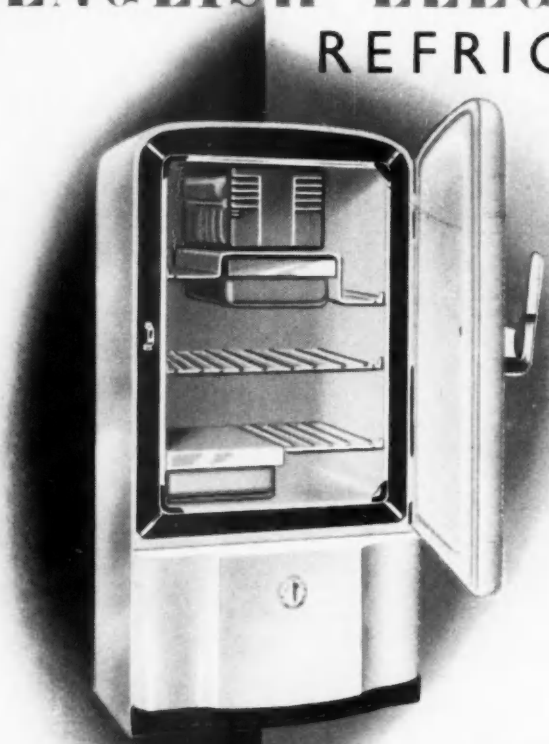
ELECTRICAL TIMES

THURSDAY
3 AUGUST
1950
SIXPENCE

'ENGLISH ELECTRIC'
REFRIGERATOR



Model 6A

- 6·4 cu. ft. storage capacity.
- Silent and fast-freezing.
- Hermetically-sealed freezing unit.
- RITEMP control gives nine different settings.
- Motor fitted with overload protection device.

DIMENSIONS:
Height 57¾ in. Width 28¾ in.
Depth (over door handle) 26½ in.

AVAILABLE FROM STOCK.

The ENGLISH ELECTRIC Co. Ltd.
Refrigeration Dept.—East Lancashire Road, Liverpool. 10.

See also 'English Electric' Fusegear advertisement, page 28

QUICK DELIVERY

Flameproof lighting equipment

FLAMEPROOF HANDLAMP
for use with TRS Flexible cable, built of aluminium alloy. Moulded flameproof lamp-holder. Thermal shock resisting glass. Full flameproof features

FLAMEPROOF LANTERN (200 watt)
for use with conduit. Maximum heat dissipation 20° light cut-off (Internal reflector) Cast aluminium body. Class B (B.S.889) cover glass. M.O.F. & P. Cert. Flp. 2272

FLAMEPROOF CONNECTION BOXES
for use at all intersection points of flameproof conduit systems. Greatly facilitates drawing through of cables. Malleable Cast Iron construction. M.O.F. & P. Cert. Flp. 1573

D.P. FLAMEPROOF SWITCHES
for conduit wiring. Protected operating handle. Quick make and break movement in separate flameproof enclosure. Permanent connections via independent terminal chamber. M.O.F. & P. Cert. Flp. 305

MADE BY THE HOUSE OF **Simplex**

For oil refineries, railway yards, distilleries, paint works, chemical works, printing works, etc.

Simplex Electric Company Limited Oldbury Birmingham & Branches

A TI COMPANY

WAKEFIELD OIL FOR INDUSTRY

The main turbines and ancillary equipment of the new Kingston Power Station are lubricated exclusively with Wakefield Industrial Lubricants.

British Electricity Authority use

C. C. WAKEFIELD AND COMPANY LIMITED · LONDON · W.1

A

Why this machine is a pleasure to sell

(and profitable too, of course)

World patents pending

It is designed on entirely new principles.
It is made by one of the foremost firms of precision engineers in the country.
It has been subjected to the most severe of tests by practical housewives.
Every job it does, it does perfectly.
It is simplicity itself to assemble, to operate, and, not least, to clean.
It is practically trouble-free.
And incidentally, it is very handsome.

THE 'LAMMIX' MIXES, MINCES, BEATS, WHISKS, KNEADS, GRATES, SLICES, MAKES SAUSAGES, EXTRACTS JUICE, ETC., ETC.

Apply to address below for full details.

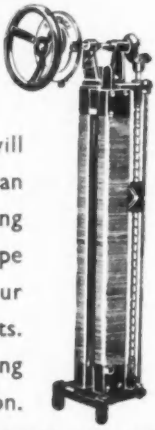
Lammix
MIXER-MINCER

Manufacturers: HUWOOD COMPONENTS LTD · ST. PETERS · NEWCASTLE-UPON-TYNE, 6

JOHN RIGBY & SONS, LTD

SLIDING RESISTANCES

for all purposes

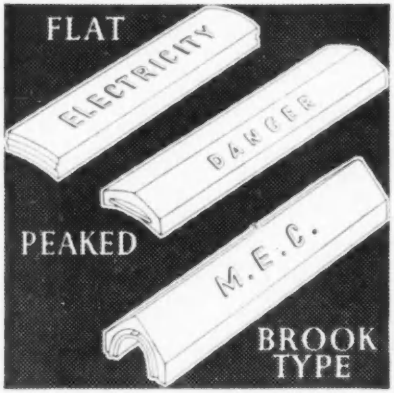


At a price you will approve, CRESSALL can supply you with a Sliding Resistance of the type and size to meet your particular requirements. Make a point of getting in touch with us soon.

CRESSALL

registered Trade Name of—
The CRESSALL MANUFACTURING CO. LTD
Tower Street, Birmingham 19.
Telephone: ASTon Cross 2666 (3 lines).
Telegrams: OHMIC, BIRMINGHAM

CABLE COVERS



VINCULUM CONCRETE Cable Covers. Easy to lay but difficult to displace. The ends are shaped concave and convex and are joggled in thickness. The joint interlocks and prevents lateral and vertical displacement. Stock markings are Electricity and Danger, other marks to order. Thoroughly reinforced with main and cross bars, or to B.E.A. Specification.

TYPE	SIZE	NO. PER TON
Flat	36" × 12" × 2"	50
,,	,, 11" ,,	52
,,	,, 10" ,,	55
,,	,, 9" ,,	60
,,	,, 8" ,,	65
,,	,, 7" ,,	70
,,	,, 6" ,,	80
,,	18" × 6" ,,	170
Peaked	36" × 12" × 2½" to 1½"	50
,,	,, 11" ,, ,,	52
,,	,, 10" ,, ,,	55
,,	,, 9" ,, ,,	60
,,	,, 8" ,, ,,	65
,,	,, 7" ,, ,,	70
,,	,, 6" ,, ,,	80
,,	18" × 6" × 2" to 1"	160
,,	18" × 4½" ,, ,,	200

Brook Type are made in three sizes for cables up to 1¾", 2¼", and 3" diameter. Radius Units are made to work with all three sizes.

Other Units for the Electrical Engineer include Joint Coffins, Tee-Service and Couplings Boxes, Cable Posts, Pole Splints, Ducts and Covers, Valve Chambers, etc. Paving Flags and Road Kerb, Fencing for every purpose, Walling Blocks, Floors & Roofs. Sectional and pre-fabricated hutting, Tunnel Units, etc.

Quotations by return of post for any quantity. Immediate deliveries by road alongside trenches to suit daily requirements, or by rail to nearest station.

Head and Registered Office

TARMAC LIMITED,
VINCULUM DEPT.,
ETTINGSHALL,
WOLVERHAMPTON.

Telephone: Bilston 41101-8

in the baby show

And *what* a baby. The Baby Belling has an oven capacity of 1,943.5 cubic inches—which in housewives' language means the largest joint, with its attendant roast "spuds", a Yorkshire pudding, and the "afters" in the shape of a fruit pie, flan or tart, all cooked comfortably in the oven for the same meal. And that's not all. On top is a grill-boiling plate 10½" x 8" for three or four saucepans, while the grill takes two big kippers or plenty of toast. Then there's a large compartment under the oven for keeping plates and meals hot. The Baby Belling will regularly cook all the meals for a family of two or three, and can cope successfully with larger numbers when occasion demands. Some baby!

LIST NO. 45A BABY BELLING COOKER
£12 . 10 . 0. Consumption: Full-on 3.2 kw.
Overall size: 18" wide x 15½" deep x 20" high. Weight: 71 lbs.
Finishes: White vitreous enamel with black vitreous hob.
Two-tone cream with black vitreous hob, 5 - extra.
AVAILABLE ON STAND (40/- extra) OR CABINET (80/- extra).
Simmerstats can be fitted in place of "Three-heat" switches at 15 6 each.

You can't beat a 'Belling'

ALL ORDERS CAN NOW BE FULFILLED PROMPTLY

BELLING & CO. LTD., BRIDGE WORKS, ENFIELD, MIDDLESEX

CRC 345

WORLD ACCLAIM!

"Sterline"

overhead low-voltage transmission cable, embodies features which we can justly claim to be abreast of, if not in advance of the times. Not only do we ignore climatic extremes, we know STERLINE has a lower initial cost—is lighter in weight and is easier to handle than the "old" braided and compounded weather-proof aerial wire. Needless to say, we have made and are still making many thousands of miles of the type we now call "old", simply because we stress the importance of pleasing all cable users.

Full details of STERLINE will be sent on request: these will include specification, sizes, weights and prices.

STERLING

CABLE COMPANY LIMITED

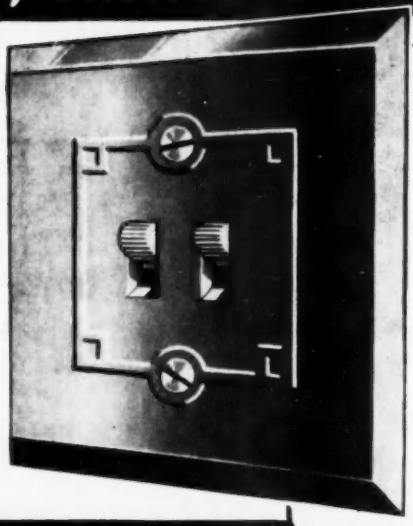
ALDERMASTON BERKSHIRE

TELEPHONE READING 1000

TELEGRAMS "STERLING PHONE READING":
WORKS AT ALDERMASTON AND WARRINGTON, LANCS.

B

CUMBRIAN
Tumbler Switches

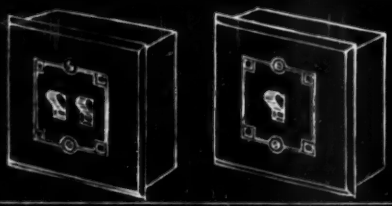


The new Cumbrian range of Switches (flush-surface-semi-recessed) have been tested by the National Physical Laboratory with commendable results.

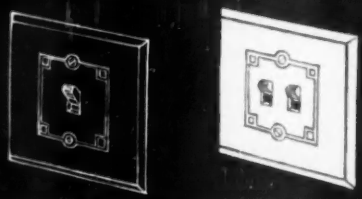
They incorporate many famous features, such as single or double switches in same size 1299 box; one way or two way types; simple assembly in box which allows 5° alignment of switch.

Write for list C.E.2.

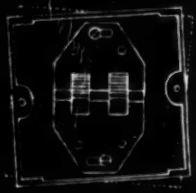
SINGLE OR DOUBLE SWITCH IN SAME SIZE B.S. 1299 BOX



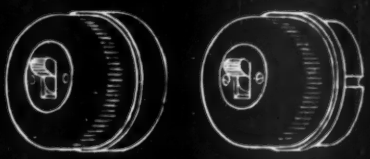
BROWN OR IVORY FINISH



SLOTTED MOUNTING BRACKETS ALLOW 5° ALIGNMENT OF SWITCH



SURFACE AND SEMI-RECESSED TYPES



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OIL-IMMERSED

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BETTER PLATING

Rectifier Style D.O.P. 7/1,000
Output 7 volts 1,000 amperes

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WESTALITE PLATING RECTIFIERS

for electro-deposition processes such as Anodising, Brass Plating, Chromium Plating, Nickel Plating, etc.

Air-cooled sets supplied for Silver Plating and Gilding.

For details of our extensive range write for Data Sheet No. 44 to Dept. E.T.17

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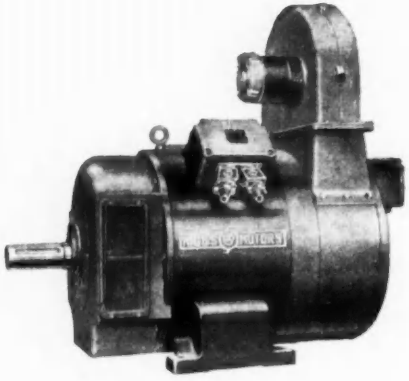
WALTER F. HIGGS, M.I.E.E.
CHAIRMAN
BIRMINGHAM 6
ENGLAND



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A three-phase commutator motor designed to give a wide speed variation by the simple operation of a handwheel : Leaflet 46 fully describes these unique machines.

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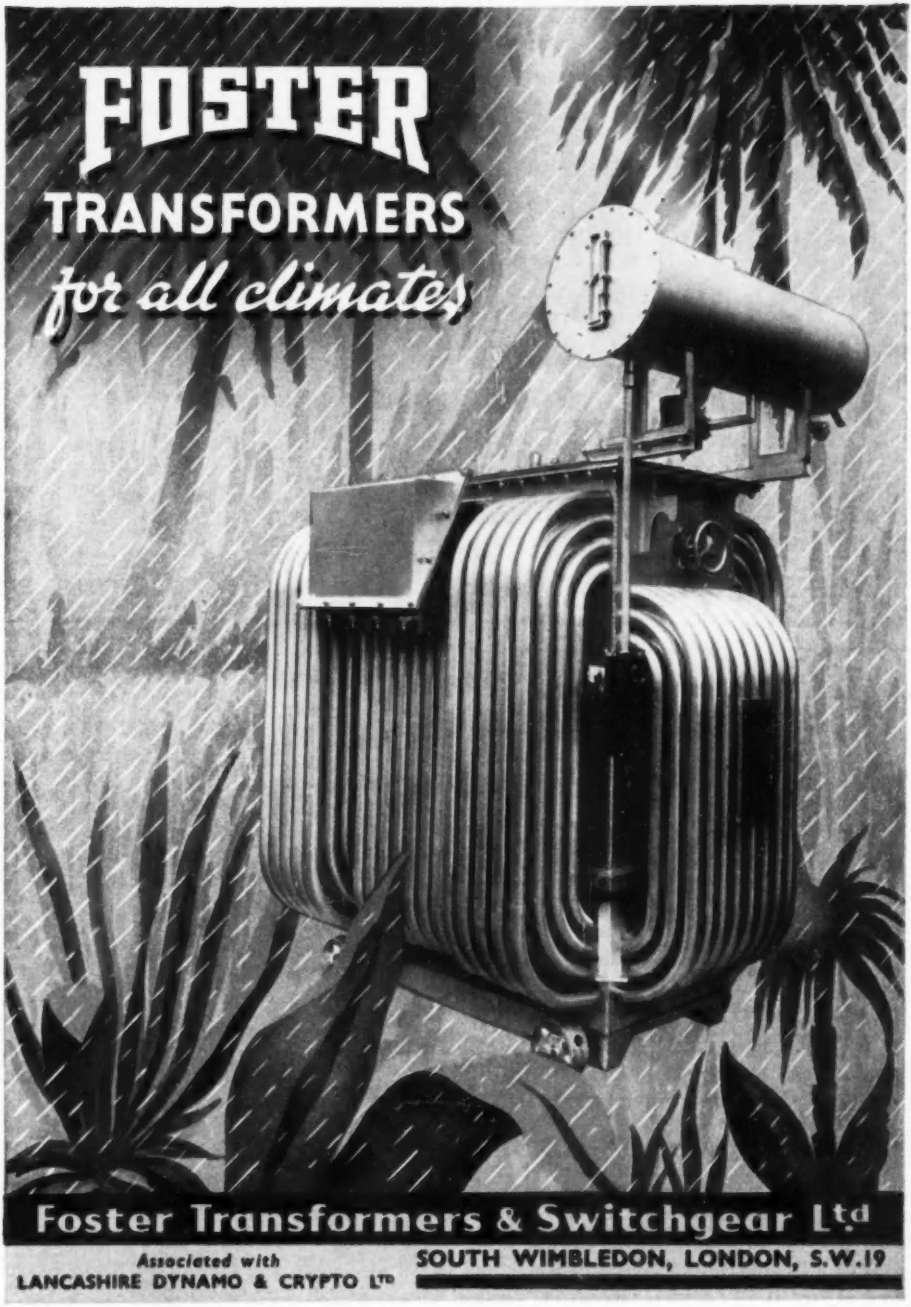
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TRANSFORMERS
for all climates
Foster Transformers & Switchgear Ltd
Associated with
LANCASHIRE DYNAMO & CRYPTO LTD
SOUTH WIMBLEDON, LONDON, S.W.19

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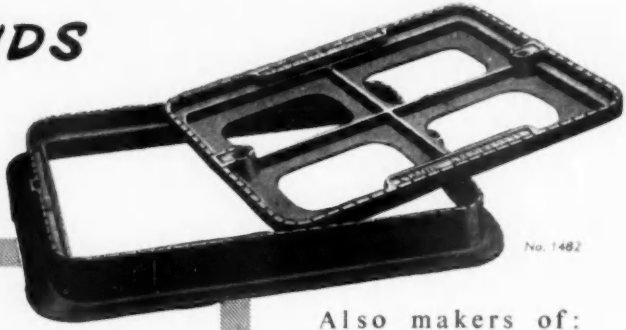

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COVERS AND FRAMES
16 Standard Sizes

Also makers of:
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M-W.101

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STEEL STORAGE EQUIPMENT FOR FACTORIES and STORES

Seco Steel Equipment is suitable for all storage requirements giving maximum storage capacity in the minimum floor space. A Seco Standard Unit is available to suit your every storage need. All units can be easily assembled with a screwdriver and spanner by unskilled labour on site. We also undertake the production and installation of storage equipment to customers' own specifications. The illustrations show a few standard units from the Seco Range particularly suitable for the storing of fittings, meters, etc.

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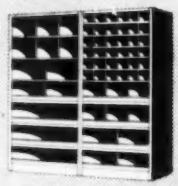
STEEL STORAGE EQUIPMENT

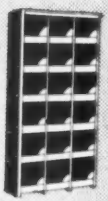
THE STEEL EQUIPMENT Co. Ltd.

Greets Green, W. Bromwich, Staffs, Eng.

Tel.: Tipton 1137-8-9. *Grams.:* Equipit, W. Bromwich.

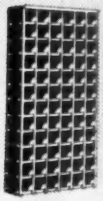


No 950/1 Closed Type

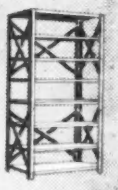


No 980/63/2S Dished

No 950/10



No 980/13/1S Flat



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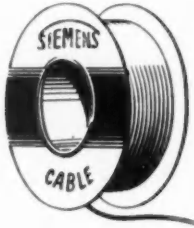
SIEMENS

V·I·R

CABLE



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AT ALL BRANCHES

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Cables and Flexibles

FOR ALL

DOMESTIC ELECTRICAL PURPOSES

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DEANSIDE RENFREW SCOTLAND

LONDON OFFICE: MANFIELD HOUSE, 376/379 STRAND, W.C.2.

Immediate Delivery

These famous switches are now available in quantity for both home and export markets!

- Quick make and break movement
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- Substantial wiring terminals
- Fixing straps for automatic earthing
- Fully insulated for all climatic conditions
- Dirt-resisting covers and knobs in brown bakelite or polished brass
- Surface, semi-recessed and flush patterns
- Standard and silent types

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SIMPLEX ELECTRIC CO LIMITED
OLDBURY, BIRMINGHAM, AND BRANCHES

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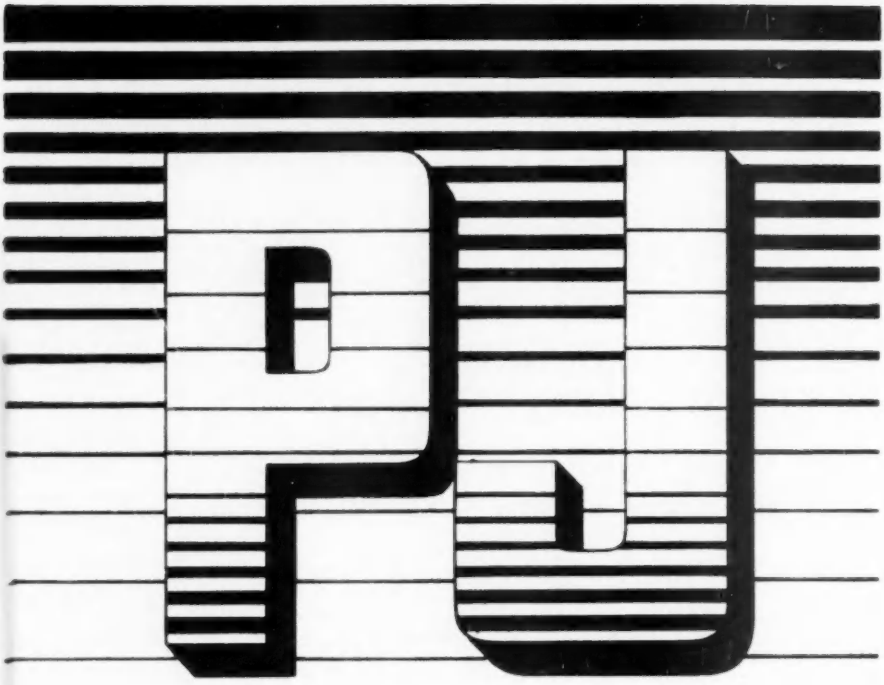

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PARTRIDGE, JONES & JOHN PATON LTD

PONTNEWYNYDD, NEAR PONTYPOOL

TELEPHONE PONTYPOOL 131/2

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As the

FINANCIAL TIMES *says..*

cause
in some substitutes,
a greater strength which makes it possible
"Because of the previous scarcity, the use of lead sheathing was discontinued over a wide field of Post Office and household cables. Plastics and rubber have proved convenient substitutes, and experience proves that the old standards insisting on lead were quite unnecessary over a wide range. For power cables, lead sheathing is still strongly entrenched; **but an important British maker has successfully developed a seamless aluminium sheathing which is widely accepted and used on an increasing scale.** It possesses a greater strength which makes it possible in some cases to dispense with armouring, and other advantages are also claimed."

"Aluminium sheathing is being widely accepted and used on an increasing scale"

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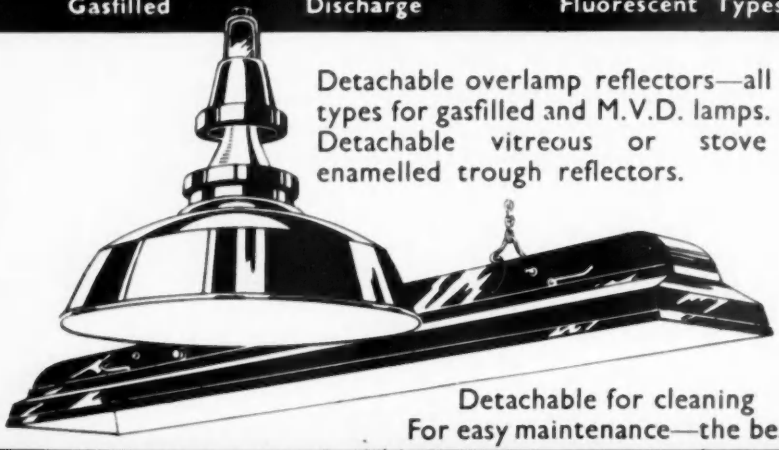
THE FIRST CABLE MAKERS IN THE WORLD TO INTRODUCE

SEAMLESS ALUMINIUM SHEATHED CABLES

BRITISH PATENT NOS. 627815. 627793

THORLUX INDUSTRIAL LIGHTING EQUIPMENT. Manufacturers of Gasfilled Discharge Fluorescent Types



Detachable overlamp reflectors—all types for gasfilled and M.V.D. lamps. Detachable vitreous or stove enamelled trough reflectors.

Detachable for cleaning
For easy maintenance—the best.

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THERMOSTATICALLY CONTROLLED

IMMERSION HEATERS

fully guaranteed for TWO years. We shall be pleased to quote for your Industrial, Domestic and general heating requirements. Write for trade terms to the sole manufacturers

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THE development plan of **THE STEEL COMPANY OF WALES** goes steadily forward and all the Sites are now nearly covered with buildings, roads and rail tracks. The plant is coming into operation section by section and January of next year should see the Continuous Hot Strip Mill getting into its stride. Products of the Company will be—

Hot Rolled and Cold Reduced Sheets and Coils up to 72″ sheared width in qualities for auto-bodies, vitreous enamelling, extra deep drawing, etc. • Galvanized Flat and Corrugated Sheets • Electrical Sheets for Dynamos and Transformers • Stainless Steel Sheets • Blackplate • Hot and Cold Reduced Tinplate both hot dipped and electrolytically tinned • Plates $\frac{1}{8}$″ thick and upwards by up to 72″ wide • Flange, Bullhead and Bridge Rails • Fishplates • Steel Railway Sleepers • Sections • Slabs • Basic Pig Iron • Coke and By-Products • Sized Limestone.

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BI Callender's

PRESSED COPPER SERVICE BOXES

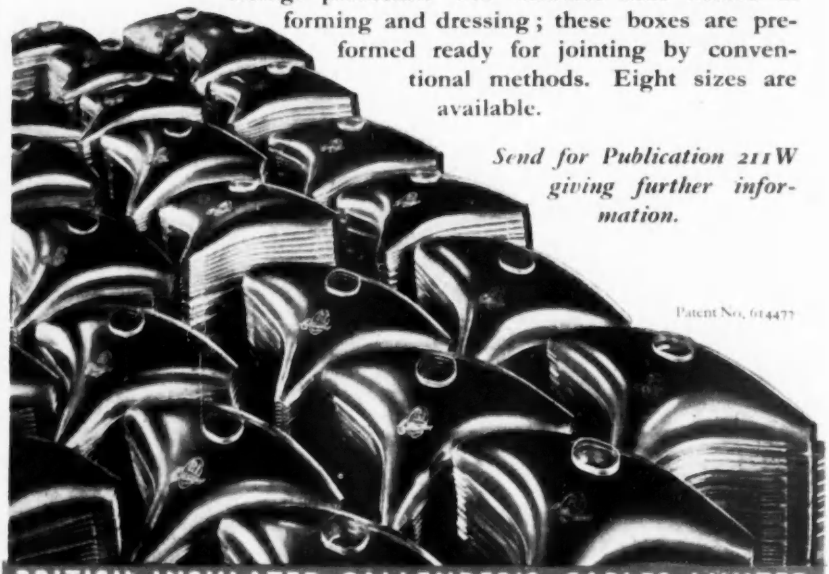
LIGHTWEIGHT

ECONOMICAL

READY FOR USE

Consider the benefits obtained by using BICC Pressed Copper Service Boxes. With lead at its present high price, the purchase of COPPER boxes shows an *immediate* saving. Moreover they are strong, lightweight and easily stacked, thus simplifying transport and storage problems. No valuable time wasted in forming and dressing; these boxes are pre-formed ready for jointing by conventional methods. Eight sizes are available.

Send for Publication 211W giving further information.



Patent No. 614477

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

JOVE
AND HIS LIGHTNINGS

White flame flashing earthwards from the riven sky, to split the oak and cleave the granite crag.

Olympian might made visible to mortal man, that he may know the majesty and awful wrath of gods.

In Greek mythology and Saxon song, in warlike sagas of the Norse, in mystic legends of Valhalla and northern Rhine, the lightning's flash illumes the fury of the Gods . . .

So down the ages until man, outpacing superstition through science, strikes the spark—and in the bare passage of a century, transforms titanic omnipotence to a trained servant, obsequious behind a thin wall of white porcelain.

TAYLOR, TUNNICLIFF PORCELAIN

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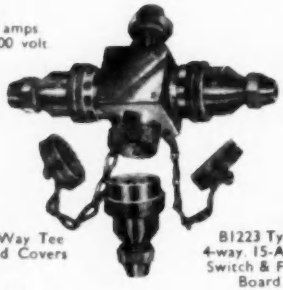
for all electrical purposes

Plug

5/300 amps
250 500 volt



3-Way Tee and Covers

Flange Socket and Cover

B1223 Type 4-way, 15-Amp Switch & Fuse Board

Latest Catalogue on Application.

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CINEMA, STAGE AND BALLROOM
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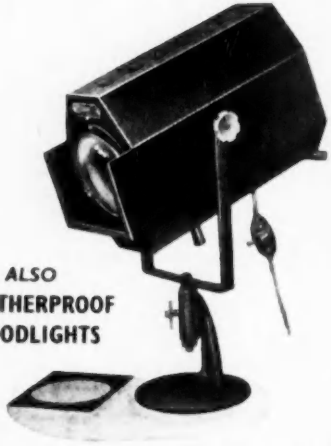

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D. WALTER & CO. LTD., ACTUAL MAKERS
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Market Harborough.

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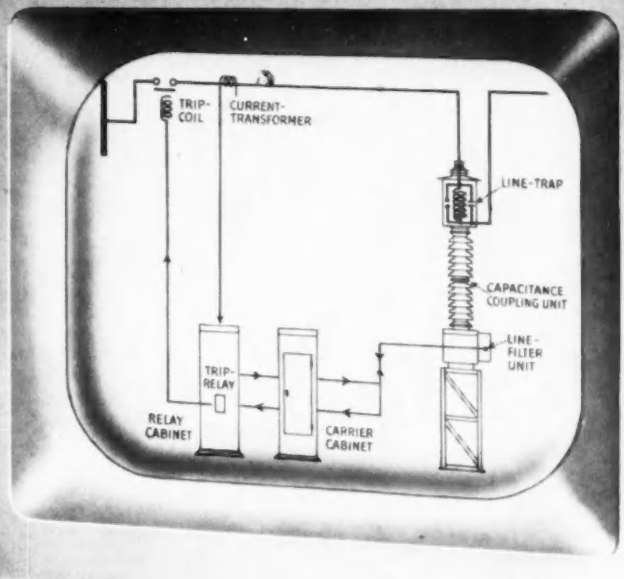

..PHASE

CARRIER-PROTECTION

compares the phase-angle of the fault-current at each end of the feeder

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Specialists in Electrical Washday Appliances
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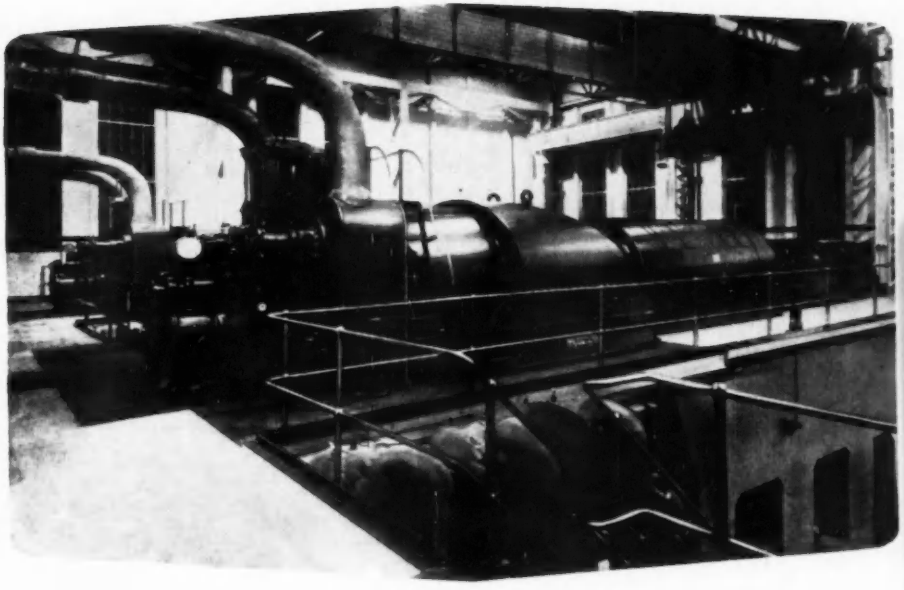
ELECTRIC WASHBOILER
CAT. NO. *E840*

BURCO LTD · ROSE GROVE · BURNLEY · LANCS.

Catalagzi Power Station



Metropolitan-Vickers were the main contractors for this power station which contains three Metrovick single-cylinder, direct-coupled turbo-generators complete with condensing plant and auxiliaries.

The three turbo-generators are each of 20,000 kW capacity at 3000 r.p.m. with initial steam conditions of 37 Kg/cm² gauge and 425°C; three-stage feed heating is employed to give a final feed temperature of 150°C.

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A member of the A.E.I. group of Companies

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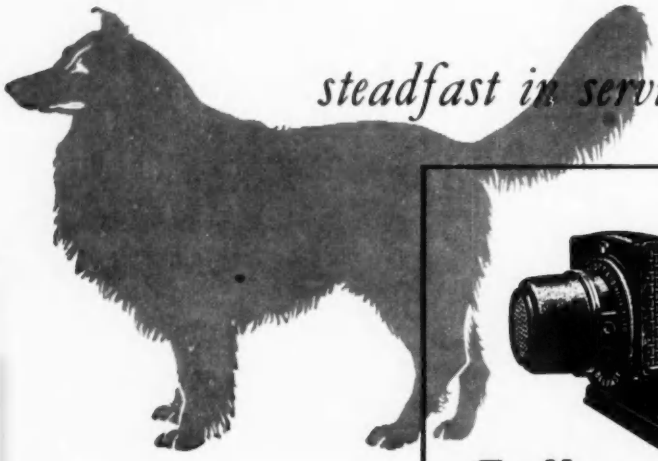
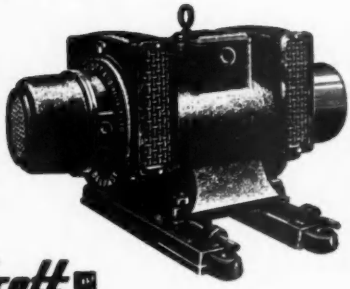


steadfast in service



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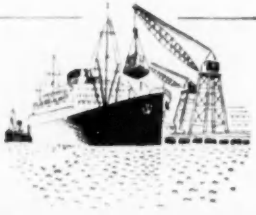

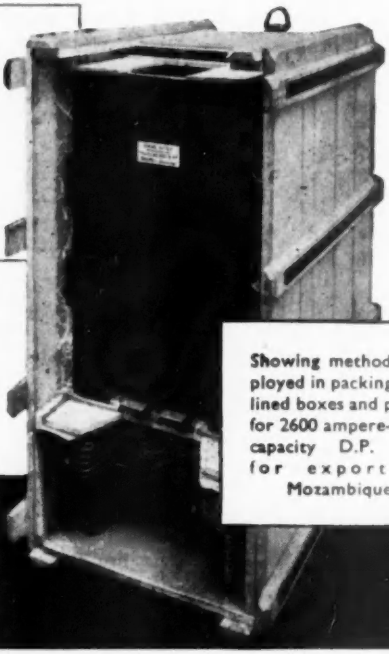

Showing method employed in packing lead lined boxes and plates for 2600 ampere-hour capacity D.P. cells for export to Mozambique.

D.P. BATTERIES

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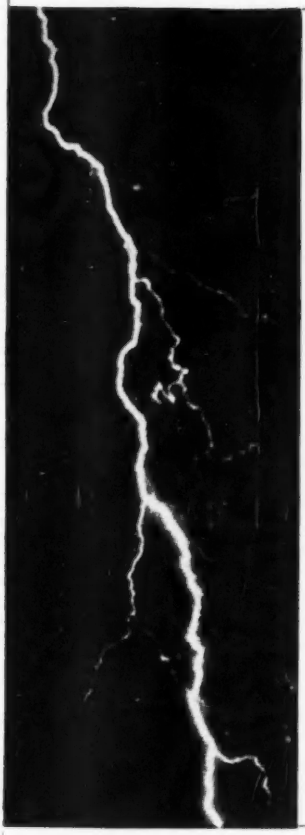
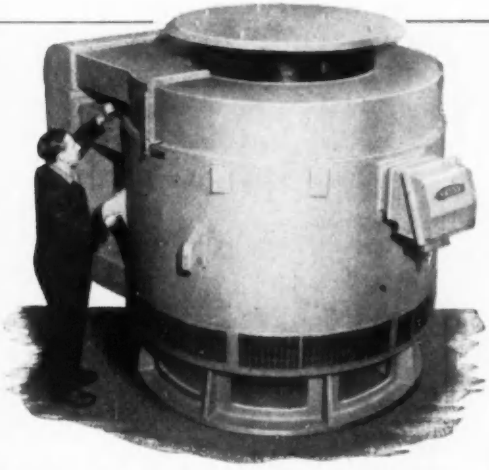
BAKEWELL DERBYSHIRE.
LONDON: 50, GROSVENOR GARDENS, S.W.1.

the question is **POWER-**





Backed by 70 years electrical research, progressive design and development, Brush motors provide a standard of efficiency and performance that has taken them into Industry in every part of the world. Somewhere in the range is a Brush motor to suit your needs precisely.

The Brush range of A.C. motors includes sizes from 1 to 1500 h.p. slipring or squirrel cage. The Brush D.C. range covers standard requirements enabling the most economic size to be selected for any given duty. The illustration shows a 600 h.p. Induction Motor for operating a circulating water pump in a Power Station.

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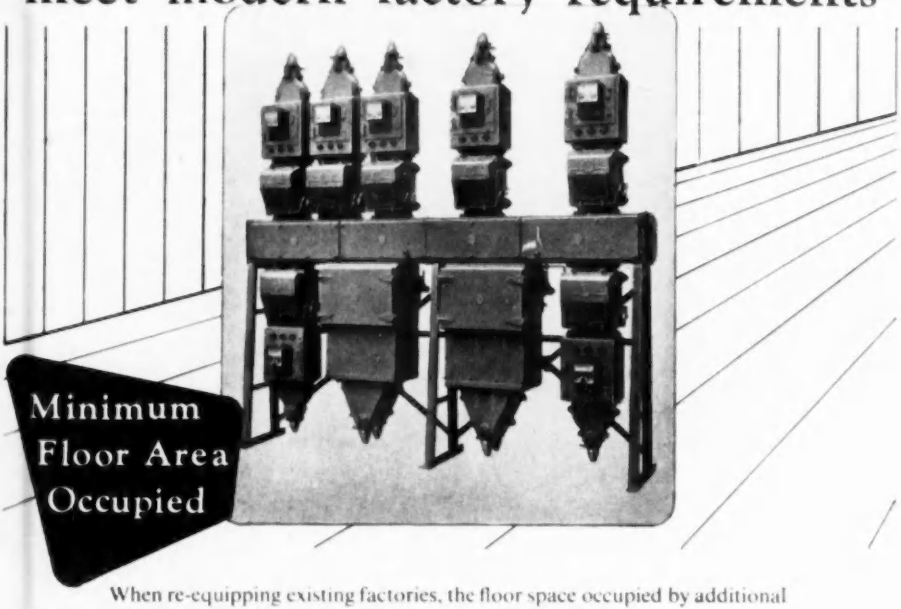
The Brush Electrical Engineering Co. Ltd. Loughborough, England.
London, Birmingham, Cardiff, Manchester, Leeds, Newcastle; Glasgow.

'ENGLISH ELECTRIC'

Combination

Fuse-Switch Boards

meet modern factory requirements



When re-equipping existing factories, the floor space occupied by additional distribution equipment is at the expense of production area.

'English Electric' Combination Fuse-Switch Boards are designed to permit direct-to-wall mounting with all parts accessible from the front, the maximum projection from the wall is only 1' 10".

The Board illustrated controls three 300-amp. and four 150-amp. feeder circuits, with two 500-amp. incoming switches, and provision for a fourth 300-amp. feeder circuit to be added later.

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Works also at STAFFORD · PRESTON · RUGBY · BRADFORD

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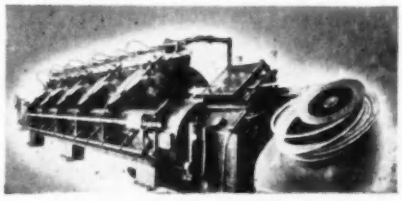

A modern plant for wire manufacture

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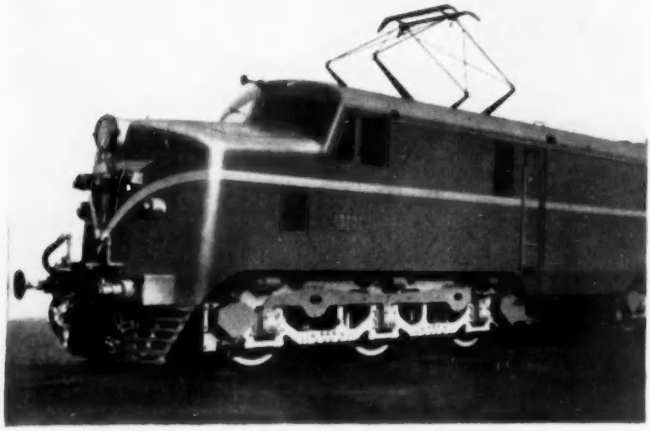
M.168



ELECTRIC LOCOMOTIVES FOR BRAZIL

Fifteen of these superb 3,000 h.p. electric locomotives, designed and manufactured in this country by the English Electric Company in conjunction with the Vulcan Foundry Limited, are being supplied for use in Brazil. They are claimed as the largest and most powerful to be built in Britain. The Cables used in these latest designs bear the **C.M.A.** Mark of highest class efficiency.

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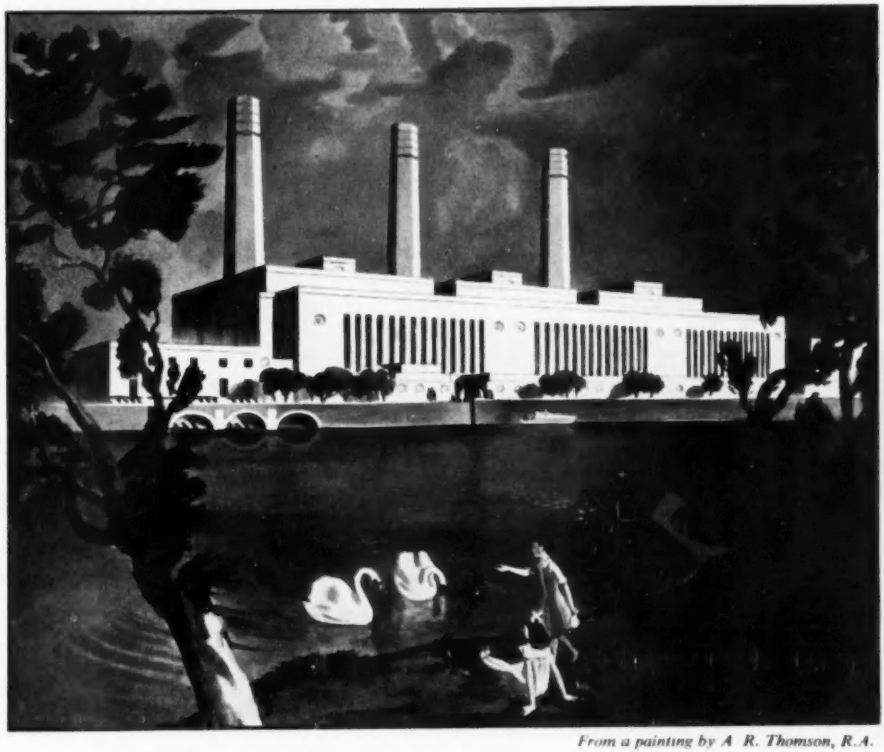

From a painting by A. R. Thomson, R.A.

Another New Power Station

ON THE WEST BANK of the River Trent, near Newark, stands one of Britain's finest power stations. Staythorpe — the fourth great post-war power plant to be brought into operation by British Electricity — is an engineering triumph of which the nation can be proud.

A great achievement

The entire 150-acre site of this power plant was raised 9 feet to bring it above flood level. 1,600 people have laboured, building roads and railways. Thousands of tons of steel and concrete and millions of bricks have been used. The plant and equipment were made in workshops all over Britain. Already one third of the plant is in operation and, when completed, the total output of Staythorpe will be 360,000 kilowatts. An unusual feature of the station is the use of "Spreader" type stokers — the first large-scale installation in this country. The coal is spread by eight rotary feeders.

What it means to you

Staythorpe is only one of 38 power stations being built by British Electricity. In addition, 43 existing stations are being extended to give increased output. It is part of the plan to provide Britain's factories and workshops, farms and homes with the abundant power they urgently need.

more power FROM STAYTHORPE **means more power to the nation**

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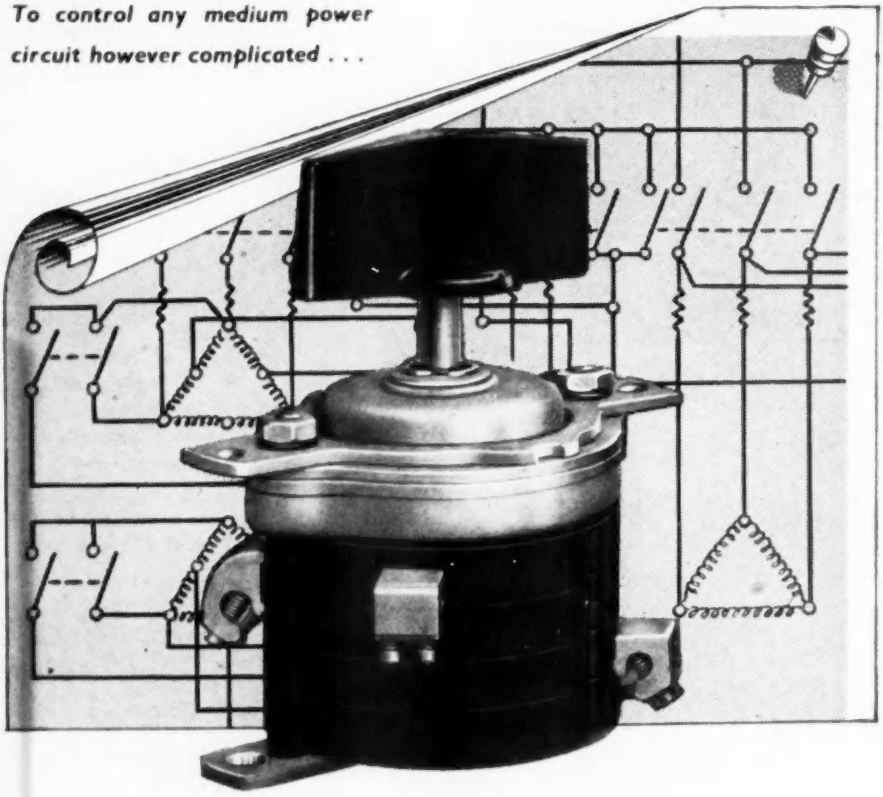
FERRANTI LTD. Hollinwood, Lancs *London Office:* Kern House, Kingsway, W.C.2.

To control any medium power circuit however complicated . . .



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SANTON switches operate on a simple rotary movement.

SANTON switches have large, easily accessible terminals, plainly marked.

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SANTON switches can be delivered promptly and give years of trouble-free service.

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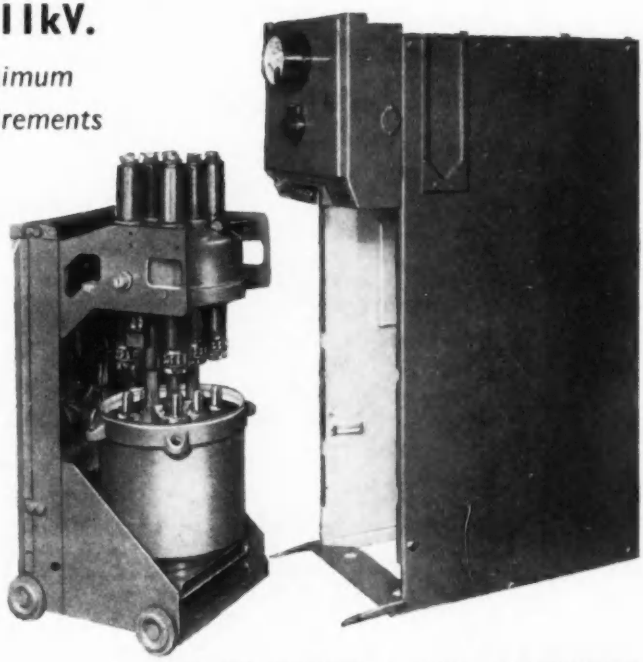
with minimum space requirements



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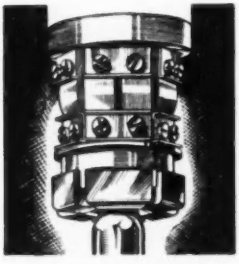
Innumerable short circuit tests prove the dependability of the **BV UNIT**



The 'FERGUSON PAILIN' BV unit is self-contained, of the metalclad type, giving adequate protection against fire risks, and designed for extension to similar, or other, switch units and isolators as required.
Each circuit breaker is contained in its own truck, giving easy access for inspection or maintenance, and is interchangeable with other units where ratings and small wiring interconnections are identical.
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The separate spring loaded segments of the fixed contact in an oil circuit breaker contact assembly. (Types BRI4 and BRP4 circuit breakers.) This feature ensures perfect alignment when the lower contact moves into the closed position.
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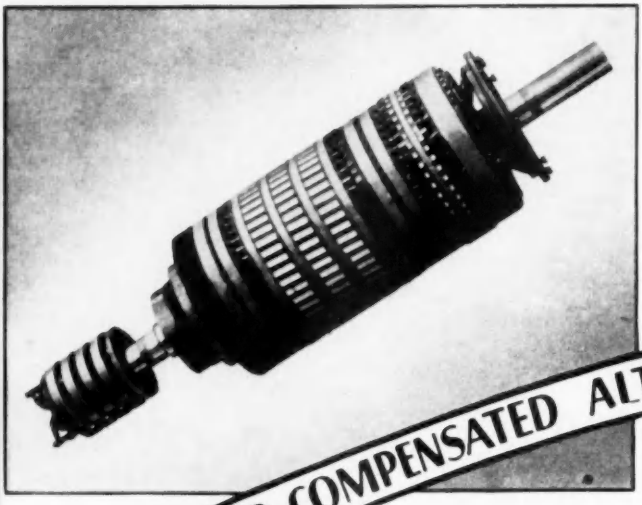

ROTOR FOR COMPENSATED ALTERNATOR

Photograph by courtesy of
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Liquid capacity—18 galls. Loading—3 kW at 200/250 volts, single-phase.

Will steam 10 stone of potatoes in approximately 2 hours. An automatic device is incorporated to protect the boiler if it is allowed to run dry or is switched on when empty. A separate Control Panel provides space for fitting a Time Switch which is useful when cooking can be done on off-peak load tariffs.

Heatrae Farm Food Boilers are available in 18, 36 and 54-gall. sizes.

Please write for illustrated leaflet and full description.

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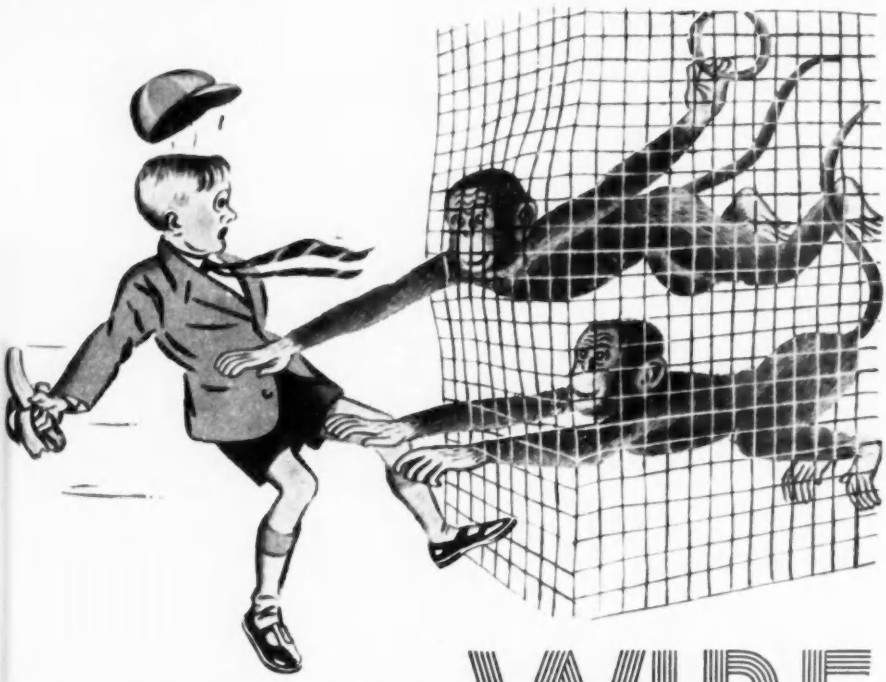

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Each wire has its purpose. Brightray wires are not for monkey cages but for resistance heating; and for each different heating purpose, there's a grade which is the very best.

BRIGHTRAY B is for elements working at temperatures up to 950° C.

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Brightray is a registered trade mark.

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B T-H

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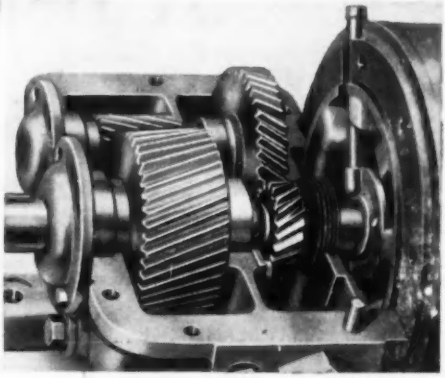
Designed and Built as an integral unit



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Double Reduction	from 20 . at	29 .	. to 70. . at. 110	
Triple Reduction	from 20 ... .at..	. 8 . .	... to 70 . ..at.... 35	

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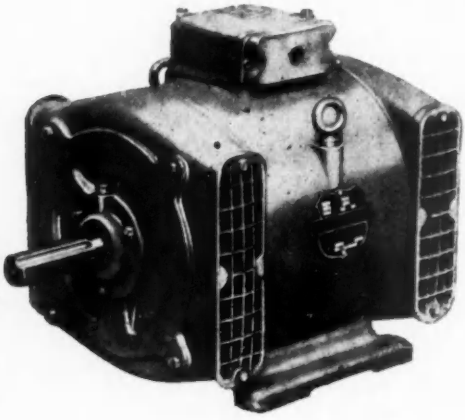

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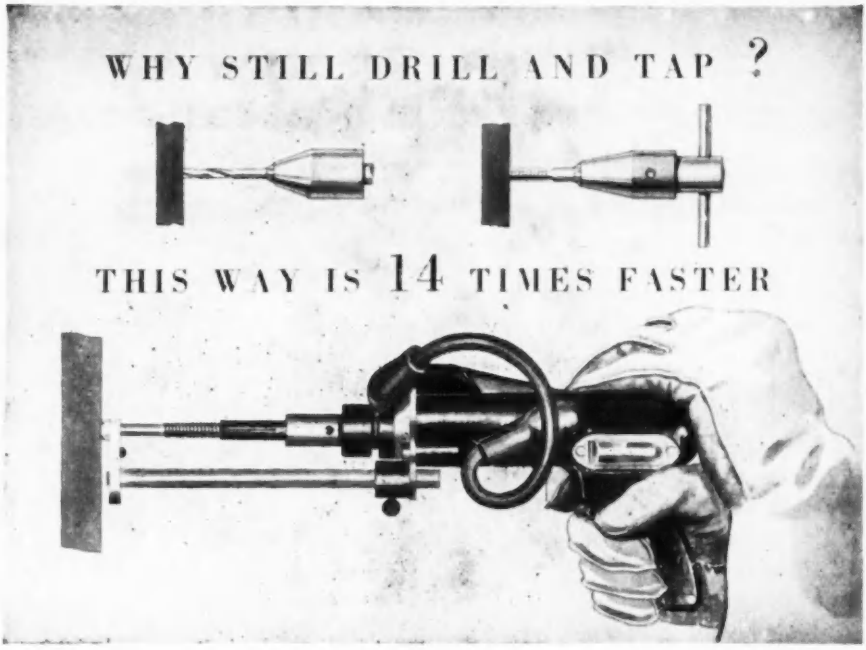

Let the Nelson stud welder fix your studs to steel with engineering precision. The easy-to-handle Nelson gun is almost entirely automatic. At the press of a trigger it completes a split-second automatic welding cycle, which ensures a perfect weld every time. There are Nelson studs to do hundreds of different fixing jobs and show substantial savings over bolts, pins and rivets. Find out how this versatile fixing tool can help you. Write for the Nelson brochure today.

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- Nelson ceramic ferrules, supplied with the studs, localise the arc and ensure perfect fusion at point of weld.
- Complete equipment comprises Nelson Gun, Automatic Timer and D.C. Welding Generator.

Send for full facts today

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STUD WELDING SERVICE

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ELECTRICAL TIMES

Vol. 118 No. 3065 THURSDAY, 3 AUGUST, 1950

PUBLISHED EVERY THURSDAY

FIFTY-NINTH YEAR OF PUBLICATION

TAYLORS LANE GENERATING STATION 175
ENFIELD ROLLING MILLS 176
OUR READERS' VIEWS 181
ORDEAL BY DEBATE 183
PROBLEMS AND PRACTICE IN ENGINEERING 185
BEVERLEY MINSTER 187
CABLE FAULT LOCATION *by J. G. Boggis, A.M.I.E.E., G.I.Mech.E.* 188
NEW LITERATURE 190
ELECTRICAL ENGINEERING SERVES MEDICAL SCIENCE 191
OVERSEAS NEWS 192
PERSONALITIES IN THE INDUSTRY 194
RURAL ELECTRIFICATION IN IRELAND 196
THE BUYER'S COLUMN 197
NEW D.C. ARC WELDING RECTIFIER 199
SELLING TECHNOLOGY 200
THE WEEK IN NEWS 201
Questions in Parliament 204
Cases in Court 205
Electric Supply News 206
Company Activities 207
COMMERCIAL INFORMATION 208
CLASSIFIED ADVERTISEMENTS 47
INDEX TO ADVERTISERS 54

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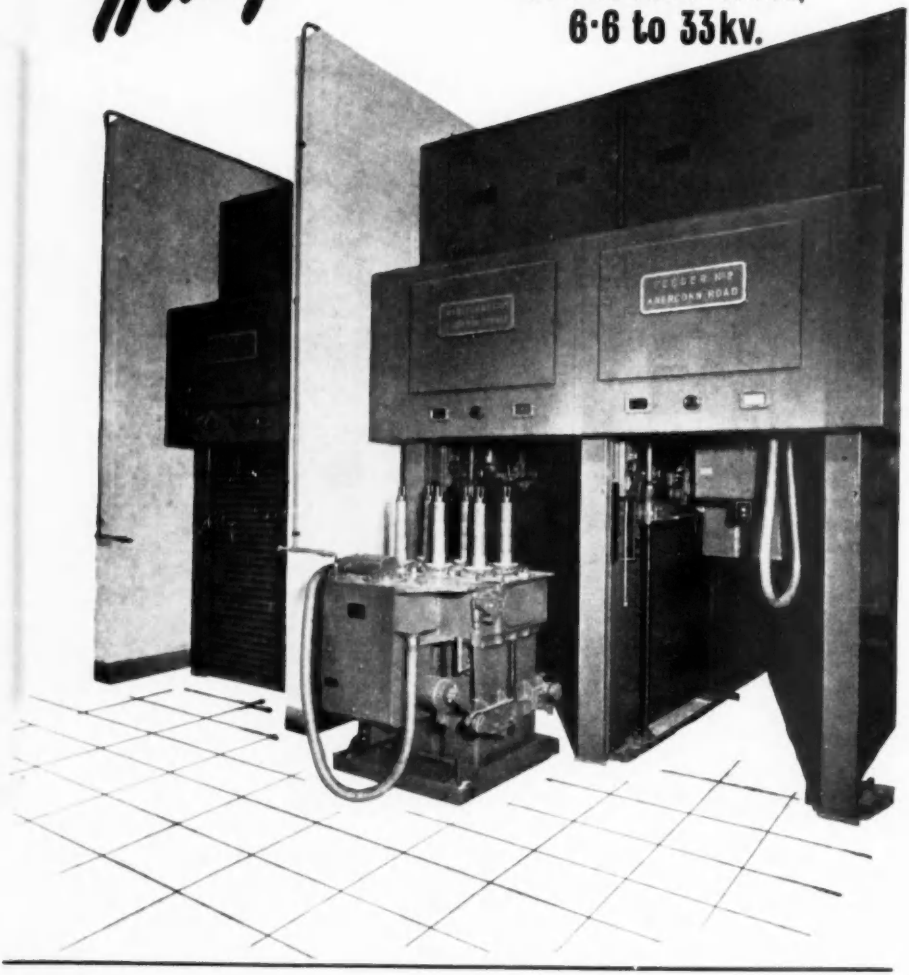

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Editorial

ELECTRICITY FOR DEFENCE

IT is a serious blow that our national economy is to suffer the impact of a new defence programme before it has regained its normal resiliency after the last war. It is too early yet to determine in what manner industry will be affected by this additional expenditure of £100 million, but curtailment and limitation of production in non-defence fields seems inevitable. It is essential, however, that any such restriction should not spread to the supply industry, which is still fighting to overtake the plant deficit created during the years of the last war. With an inability to meet present peacetime peaks, the industry would be in a sorry state if it were required to face a resurgence in production consequent upon placing industry on a wartime footing. This is the possibility that must be visualised, the eventuality for which plans must be made. It is not enough that there shall be no cutting of plant priorities, electricity supply must be acknowledged as a necessary part of the country's defence. What is more, the industry itself must recognise its obligations in this sphere, reinforcing its transmission lines as well as its plant so that it is in a position to meet any new crisis which may arise.

THE "HOUSE" DEBATES

THE history of the electrical industry is largely one of suffering at the hands of Parliament, so it was pleasing to find the debate on the B.E.A. Report last week a relatively inoccuous occasion. Much can be said in five and a half hours, but most of the speeches were subject to a heavy discount on quality and it was quite clear that the majority of speakers had little understanding of the industry. It is fortunate, however, that the Minister of Fuel and Power has a proper appreciation of the importance of high load factor appliances and takes every suitable opportunity of putting forward their case. The only drawback is that this has so far not resulted in any action, either from the B.E.A. or from the Treasury. In the general debate the most recurrent theme was the inadequacy of the consultative councils. The specific offered was the publicising amongst consumers of the consultative facilities, but, on the other hand, the second most popular theme was the excessive amount spent on publicity by the B.E.A. Parliamentary debates on specialised fields are rarely fruitful and although in duty bound we give on a later page a review of the principal points raised, our advice to engineers is to ignore the whole thing.

KNOWLEDGE FOR SALE

THERE has been much talk in recent years of Britain's need to sell scientific knowledge rather than mass-produced goods, but this commodity, it is usually assumed, will be an invisible export, reflected only in the "quality" of whatever is sold. A more direct approach is being made by Power Jets, the Government-owned company which has grown out of Sir Frank Whittle's original gas turbine team. In an effort to secure full financial reward for this country's research and development effort, it is actively selling technology directly, wrapped up only as "patent rights" and "consultancy." Salesmanship in such a field calls for even more faith in the product than is usually required, and needs an aggressive approach, the more especially because aircraft techniques are being offered as a basis for land engine designs. After all that has been said to the detriment of British sales ability, the progress of a Government-controlled firm actively operating with foreign clients will be watched with considerable interest.

ULTRASONICS

POSSIBLE applications of ultrasonics to domestic uses seem to have been capturing popular imagination of recent months and there are reports of domestic machines which do everything from washing the clothes to killing flies merely by pointing the beam in the required direction and pressing the button. Most of the popular articles we read mention the smoke-coagulating properties of high-frequency sound waves, and envisage the days when power-station emission will be entirely cleaned up by these methods. A point which is almost always overlooked is that, while many interesting effects can be demonstrated in the laboratory, their full-scale development is hampered by the difficulty of producing high-power ultrasonic vibrations, both piezo-electric and magnetostrictive methods having definite limitations in size. An interesting practical application is, however, reported from Switzerland, where a submerged oscillator operating at 27 kc/s is used for reducing the scaling of boilers by preventing lime deposits from coagulating into hard crusts. If this application produces the results claimed, it should be of interest both to industrial steam users and to power stations.

SEDIMENTARY OCCUPATION

KEEPING a watch on the "brightness" of beer is the latest application of electronic methods that we have come across. A Radiovisor equipment now checks the turbidity of some 36 million gallons a year at one of Britain's leading breweries. We hope in time to see this principle applied at the retail end of the business, since beer is even more susceptible to sludging troubles than transformer oil, and there is no guarantee that the brewer's tender care will not be offset by the cellarman up-ending the barrel at the wrong moment. A turbidity indicator, designed on pin-table lines with flashing lights and ringing bells, would be a welcome addition to the amenities of the saloon bar, and would bring to an end the conventional holding of the glass to the light and the heated argument which ensues. If any manufacturer is thinking along these photo-alcoholic lines, will he please design his apparatus to include a level indicator ensuring that the glass is filled right to the top? The theory that the half-inch of space at the top is necessary for expansion purposes has now been discredited.

Meteor

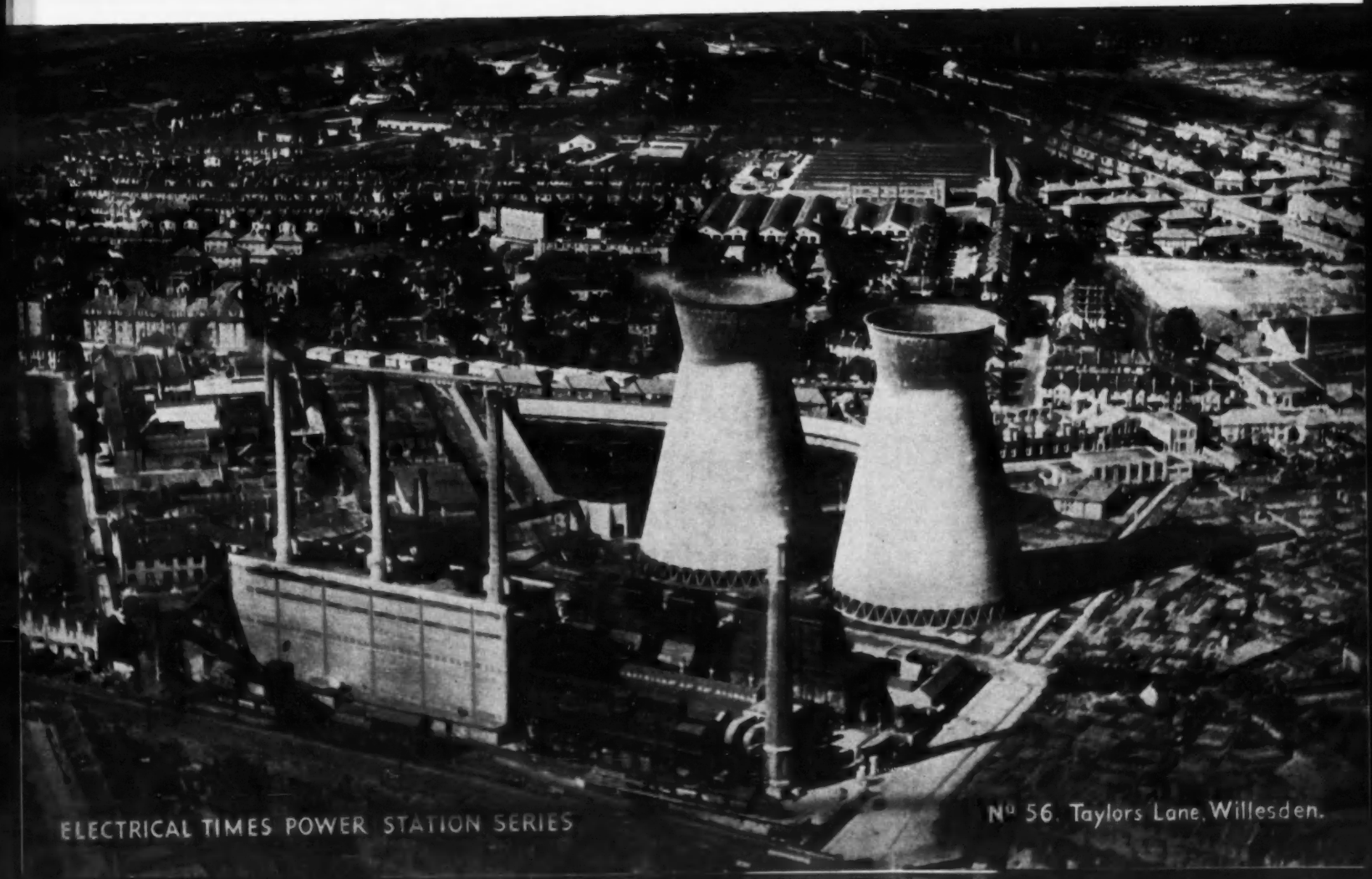
THIS WEEK'S PHOTO

BUILT in 1903 by the (then) Willesden Urban District Council on the fringe of their territory, but sold to the Northmet Power Co., before commissioning, Taylors Lane generating station now stands in the midst of a densely populated residential and industrial area. It was extended in 1912 and again extended and reconstructed between 1938 and 1943. The station comprises one low pressure unit operating at 200 lb/sq in., and generating at 11 kV, and two high pressure units operating at 1,400 lb/sq in., and 960° F. and generating at 33 kV.

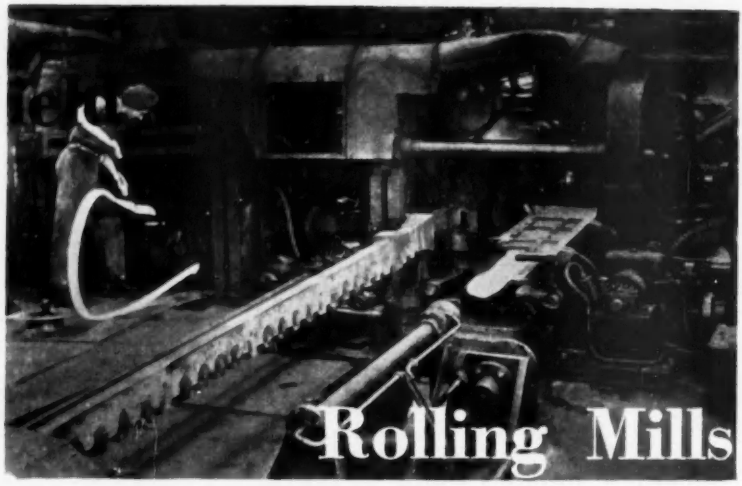
The l.p. unit consists of two B. and W. 75,000 lb/hr pulverised fuel fired boilers, and a 12·5 MW Brush-Ljungstrom turbine. The wooden cooling towers in the photograph are associated with this unit. The electrostatic precipitators were the first to be installed in this country for p.f. flue gas cleaning. No. 1 h.p. unit consists of two International Combustion 150,000 lb/hr boilers, and a Metropolitan-Vickers 32 MW turbo-alternator on which the tail end exciters, house alternator, and d.c. generators for unified boiler control are arranged side by side, and driven from the main shaft through reduction gears. No. 2 h.p. unit comprises two John Thompson—La Mont 150,000 lb/hr boilers and an English Electric 32 MW turbo-alternator with tail end auxiliaries similar to No. 1. A third La Mont boiler can be used with either h.p. unit to permit boiler maintenance without reduction of availability.

The concrete cooling towers are 220 ft high, and each handles the circulating water for one h.p. unit. Make-up is from a Grand Union Canal feeder. Coal is entirely rail borne, and can be handled by conveyors direct to bunkers, or to store, or from store to bunkers. Handling in coal store is by drag scraper. The station is connected to the grid by three 45 MVA 33 kV/132 kV transformers and handles undertaking loads up to 200 MW for Eastern and London Electricity Boards.

Future development, not yet authorised, envisages the replacement of the low pressure unit, housed in the original building at the right hand side of the photograph, by a further high pressure unit.


ELECTRICAL TIMES POWER STATION SERIES
Nº 56. Taylors Lane, Willesden.

Enf[illegible] Rolling Mills



Part of the rolling mills

Medium Voltage Installation of Unusual Capacity

ALTHOUGH in all manufacturing processes involving the use of electricity, interruption of supply involves serious financial loss, the extent of this loss is frequently dependent on the actual processes being undertaken, and cannot merely be measured by the direct production loss entailed. This is particularly so where the process involves a progressive controlled physical change which continues to take place during the period of interruption. An example of this, already described in the ELECTRICAL TIMES of March 3, 1949, is at British Nylon Spinners in South Wales where, in the event of power failure the nylon solidifies in the extruding nozzles, which means that each nozzle has to be cleared before spinning can recommence—a contingency involving such a production loss as to justify extensive precautions to ensure separate external supplies.

Similar reliability of supply is also required when electric induction furnaces are being used. An interruption in these cases is liable to permit the metal to solidify in the furnace and it is then necessary to dismantle the furnace and rebuild or replace with a spare unit, if available, before production can begin again. An example of a works in which care has been taken to ensure continuity of supply as far as is practicable, is the Enfield Rolling Mills, Ltd., which we recently visited to inspect the electrical distribution system.

In order to appreciate the distribution scheme involved it is worth while briefly to examine the history of the works. The company began in 1924 when a rod mill was put down. In those days the main drive was by a single electric motor driving the finishing train and coupled to the roughing train by a leather belt which was one of the largest in the country. After many years of useful service the drive was split, a gear box being put in the drive to the roughing train which is now driven independently from the finishing train.

The demand for copper and alloys led to the laying down of a drawing mill in 1928, containing more or less conventional equipment consisting of an extrusion press, various draw benches, cold rolls, bull blocks, trolley block and diss. By 1932 the company extended its activities by the erection of a sheet mill for the rolling of copper, brass, nickel silver and cupronickel in the form of sheet and strip. These are rolled on 4-high, 3-high and 2-high mills.

A further extension of activity was undertaken in 1933, when the zinc mill was laid down, and again in 1935 when the London Zinc Mills were taken over. The equipment here consists of 2-high mills.

Copper Processing

In 1939 the present copper refinery was built. The furnace is of the conventional type, and has a capacity of 190 tons. It is oil fired and the output is in the region of 44,000 tons per annum. In addition to the main furnace, in which copper only is refined, other furnaces are installed in the brass foundry which produces brass cakes in various alloys. These furnaces comprise Ajax Wyatt induction furnaces and Morgan Crucible oil-fired furnaces. There are also some small bale-out oil-fired crucible furnaces for casting special alloys.

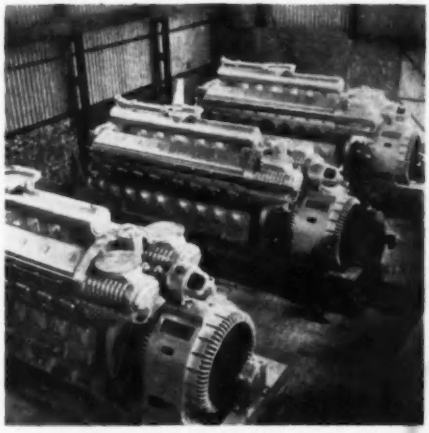
In the same year, the aluminium department came into being and this produces alloys of all kinds mainly for casting, in the form of ingots.

Main Distribution

As can be seen from the foregoing a considerable electrical load for power, heating and lighting has been installed. The company is however fortunate in its siting, which is next to the Brimsdown power station of the B.E.A. Eastern Division, and due to the amicable relationship which has always existed between the company and the old Northmet organisation direct supply from the power station to the works has been made possible. Power is drawn from the B.E.A. Brimsdown substation at 11 kV and fed to four works substations where it is transformed to a nominal 450 V for distribution. Only in two cases is a higher voltage used directly in the works. One of these is for powering one of the Ward-Leonard-Ilgner sets driving a large mill, and the other is for a Senzimar mill drive. In the first case a 3 kV supply is derived from a 1,000 kVA, 11,000/3,000 V transformer, and in the second an 11,000/2,200 V transformer, rated at 1,260 kVA is provided for a 2·2 kV supply.

Standby Plant

As can be seen from the schematic diagram, the four main substations are interconnected on the l.v. side, so that in the event of failure of any incoming feeder or transformer, supplies can be drawn from any substation possessing "live" busbars. In addition to the external supply sources the company also possesses its own



General Motors 1,000 kVA diesel generating sets provide a stand-by supply for the mills

generating station containing three diesel-driven alternators which can take over the task of supplying essential services in the event of a power failure or at such times as power cuts or load-shedding are imminent. The units are 1,000 kVA General Motors machines, and when accepting the load from the works are temporarily paralleled with the Brimsdown supply on the l.v. system. Although running the machines in parallel for any length of time is not carried out, there has been no trouble in affecting a smooth and efficient changeover from public to private supply on the various occasions when this has been necessary.

No. 10 "Robertson" strip mill

Load Growth

The electrical history of the plant is one of continuous expansion. It is partially due to this fact that the l.v. system of power distribution at 450 V has been retained and reinforced, as no opportunity has been found for the installation of higher voltage equipment except in the two special cases mentioned above. As a result, the l.v. system is remarkable for its high current-carrying capacity and its cable sizes.

Some idea of the load growth may be gained from the following figures. In July, 1925, the first substation (No. 1) was put on load to supply the rod mill. At that

time the maximum demand was 570 kVA. In the first complete year of working (1926) the m.d. rose to 1,020 kVA and the units consumed were 1,188,960. The following year these figures had risen to 1,260 and 1,813,040 respectively. By 1933 a new substation had been found necessary and No. 2 came on load, to be followed six years later by No. 3, and finally in 1949 No. 4 was started up. At present the m.d. of the works is about 8,000 kVA and the total units consumed per annum 23,200,000. In all, up to the end of 1949 the works had consumed a total of 262,033,877 units. When it is considered that the greater part of this is distributed at 450 V it can readily be understood why the cable sizes are unusually great.

Cable Considerations

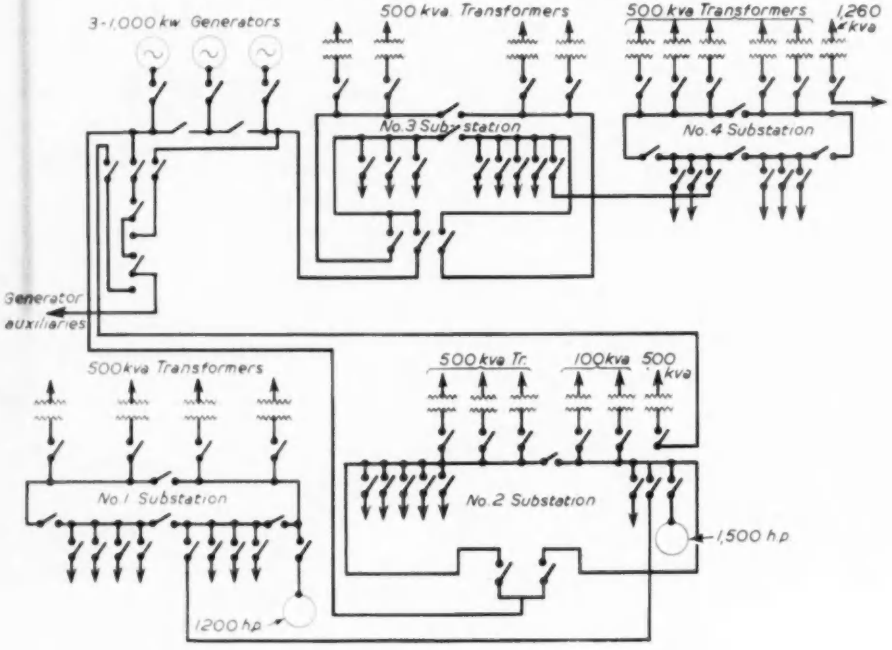
Prior to the erection of the rolling mills, an adjoining site had been occupied by a lead works which had caused acid pollution of the subsoil. When the original cables were laid directly in the soil, the acid attacked and corroded the covering, leading ultimately to breakdown of the dielectric. Owing, however, to the low distribution voltage this process took many years to cause actual failure. The situation, nevertheless, became such that it was considered necessary to obviate this trouble by running the cables in well-ventilated concrete cable tunnels. To legislate for future expansion and to enable comparative flexibility to be retained, these tunnels were made of ample dimensions and permanently fitted with electric lighting.

A further point arising in connection with these tunnels was that the site of the works is flat and lies alongside a river. In consequence it is not far elevated above the normal soil water level and has a slow run-off in the event of severe rainstorms. The tunnels have, therefore, been provided with drainage sumps, and upon the sump water reaching a certain level, pumps are automatically started up to keep the tunnels clear. Where possible, cables have also been run externally in cleats along the sides of the shops, although this practice is not general.

Nos. 1 & 2 Substations

As can be seen from the diagram, all the substations conform electrically to a fairly general pattern, consisting of a ring main busbar fed on one side by the Eastern Board's transformers (the transformers themselves being grouped and paralleled on the secondary side by an interbus connected switch) and feeding out to the works on the other side through

Schematic diagram of the Enfield Mills internal distribution system



The secondaries of the transformer are paralleled on to the low voltage busbars through six Ellison 1,500 amp switches, and some of the heaviest loads are taken off this substation. For example, the 1,500 h.p. motor driving the rod mill roughing intermediate train is fed via a 3,000-amp triple-pole isolator, the heavy current being carried by five 3-core cables in parallel, the copper section of each conductor being 0·5 sq in. Again, as in No. 1 sub, power factor correction is achieved by the introduction of a 250 kVA static condenser.

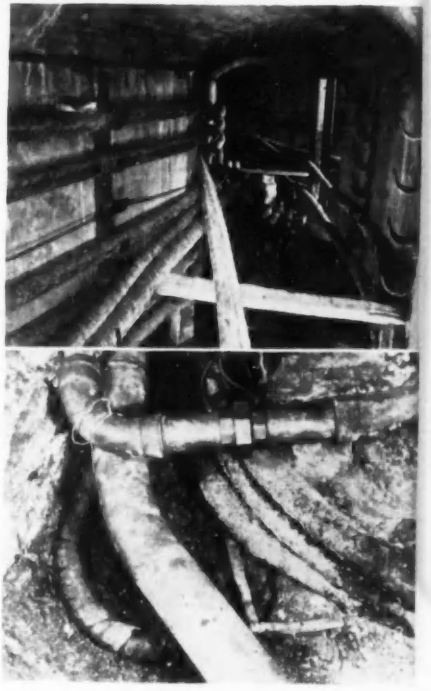
Other heavy loads supplied are appropriate feeders and switchgear. However, considerable variations exist in detail between each substation.

In No. 1 substation the bus section switches and the busbar isolation switches are rated at 2,200 and 2,400 amp respectively. The switch interconnecting this sub to No. 2 substation is a 1,500-amp unit with overload trips set at 1,500 amp. The interconnector feeders consist of two 4-core armoured cables, the copper sections of each cable being 3 by 0·5 sq in., plus 1 by 0·1 sq in. Specially designed change-over switches are also installed to enable maintenance of essential power from other substations, and a particularly heavy load is the 1,200 h.p. finishing train motor which is fed through four 0·5 sq in. armoured cables run in parallel. In order to control the power factor a 200 kVA condenser may be connected to the busbars through a 3-core 0·25 sq in. cable and a 600-amp switch.

Numerous auxiliary circuits are connected through a secondary bus system, the total number of outgoing feeders being 19.

An 11 kV feeder to No. 2 substation comes direct from Brimsdown power station, and another 11 kV feeder comes into the substation as an interconnector from the Eastern Board's 11 kV switchgear in No. 1 substation. These feeders are connected to the supply company's 11 kV switchgear, which comprises nine Reyrolle metal-clad o.c.bs.

Two of these, each rated at 300 amps 11 kV connect the incoming feeders to the 11 kV busbars, and on the outgoing side six feed the 11,000/450 V transformers. The remaining unit feeds a 1,000 kVA 11,000/3,000 transformer for an Ilgner set.



Top: Installing cables on an outside run at the N.W. end of the main shop.

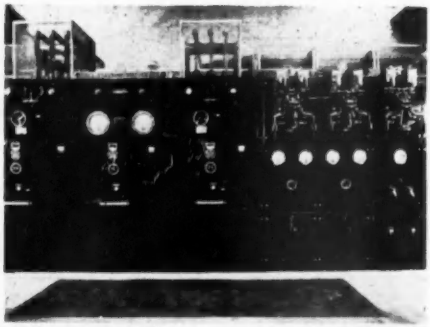
Centre: A view of the cable tunnel under construction showing a bifurcation

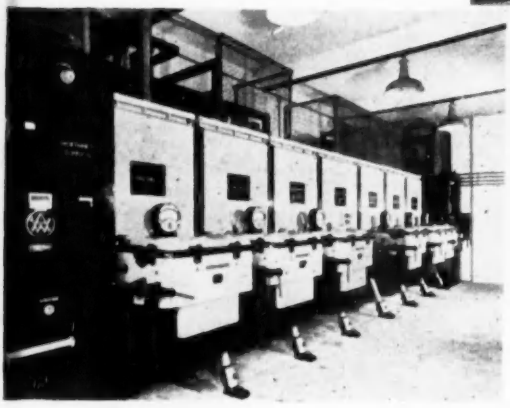
Corrosion of cable laid direct in the soil is shown in the bottom photograph of the three. Note the acute bend on old feeder

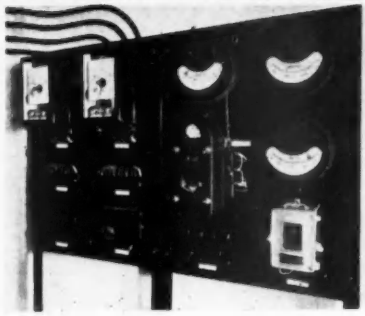
a section of the sheet mill, which is connected through two 3 by 0·5 sq in. 3-core cables, the zinc mill induction furnaces, the Birlec conveyor furnaces, and general power and lighting. The substation also contains switchgear for the company's private generating plant which can be paralleled on to the low voltage busbars in this station. Maximum demand is 3,500 kVA at the moment.

Nos. 3 and 4

Although a considerable amount of distribution, mainly to the induction furnaces, is carried out from No. 3 substation (which incidentally is also connected to the company's private generating plant) the main feature is the direct current generating plant consisting of two 200 kW 230 V motor generator sets which provide current for a wire bar scalper and for certain d.c. plant in the refinery. No. 4 substation is also fairly straightforward and distributes power to other sections of the sheet mill and zinc mills. The present maximum demand of No. 3 is 1,800 kVA and of No. 4 is 2,700.







No. 4 substation is shown above, with top right, generator a.c. and d.c. switchboards in No. 3 substation. Below, right, is a typical meter panel, this example being installed in No. 4 substation

Maintenance

Although continuity of supply is a pre-requisite to efficient working, routine maintenance is of vital importance in view of the interruption to production which may occur in the event of a motor failure. For this reason a regular inspection is carried out on every motor, the time interval being set by the working conditions and loading of the machine. The results of every inspection are entered on an individual motor log card which also gives the date of purchase, price, manufacture, horse power and other basic data of the motor concerned together with control gear information.

Apart from the normal inspection, opportunity is taken on these occasions to check the insulation resistance and winding resistances of the machine. A comprehensive range of spares is maintained to enable substitution to be carried out wherever possible, in the event of breakdown of the smaller machines.

Special attention is also paid to the routine maintenance of contactor gear of which there is a large amount working under intensive conditions, and men are specially trained in this work so that the minimum possible working time is lost even with the very difficult mode of operation that is necessary.

An unusual feature to the visitor is that many of the larger machines under suitable conditions run without end shields. This gives better ventilation in the conditions of working and also allows for regular inspection and cleaning of the windings.

Our readers' views . . .

School Lighting Economics

IT is a pity that Mr. F. J. Farmer should have based his well-written article, "School Lighting Economics," on a number of fallacies.

To mention only two of them—firstly, while opal sphere fittings are shown to have a coefficient of utilisation of 0·41, "Seagull" and "Semi-reflector" types of fluorescent fittings are quoted as 0·4 only. If the figure of 0·41 is correct, it appears to assume wall and ceiling reflection factors of 70% and 50%, and for the fluorescent fittings mentioned, the comparable figure for coefficient of utilisation would be 0·5.

Secondly, Mr. Farmer states that for primary and junior schools, artificial lighting is needed on only 50/100 hours per year. For a school day of 9 a.m. to 4 p.m. an average figure would be 450 hours per year, and this period would be greatly increased if the premises were used for evening classes or the like.

The net result of these fallacies is to show that rarely can an economic case be made out for fluorescent lighting in schools, whereas, in fact, the reverse is the case.

Martin Gaughan
LUTON B.Eng., A.M.I.E.E., F.I.E.S.

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Plug and Socket Plastics

IN a contribution bearing the above title in your issue of July 13, Mr. F. R. Haigh outlines what he describes as a quick version of a tracking test to remove doubt on the tracking properties of an insulating material. While such a test might possibly give the information required in extreme cases, the variation in results obtained with much more carefully controlled tests would appear to indicate that a simplified test is unlikely to give the required discrimination.

The difficulties involved in the problem of tracking have been dealt with fully in E.R.A. report Ref. L/T177: "Tracking in Solid Insulating Materials: A Critical Resume. By V. E. Yarsley, D.Sc., F.R.I.C., and W. J. Grant, B.Sc., A.M.I.Chem.E., F.R.I.C." in which a section is devoted to the consideration of the many types of test which have been used in the past, with varying degrees of success. As a result of this survey it has been decided that far from simplifying a test for tracking, research should be undertaken to devise a more completely controlled test which would give results with the required degree of reproducibility; this work is now in hand.

W. H. Devenish
E.R.A. A.M.I.E.E.

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TRACKING is a subject which has occupied the minds of plastics technicians since the advent of modern plastics in the electrical industry, and it is at present being investigated, in a scientific manner, by a competent body of experts.

The tracking test outlined in B.S.1322 was devised by the amino-plastics industry for the testing of amino-plastics, and was never intended to be applied to phenol-formaldehyde mouldings. All phenol-formaldehyde mouldings, good, bad and indifferent, if tested in this way, will fail, but this cannot be accepted as a criterion of the liability of such materials to fail in service.

Over the years, the writer has examined quite a number of components which have failed through tracking and has found, as many others have, that failures are usually due to one or more of the following causes:

Low grade materials, flash-over due to faulty wiring, poor design, damp, surface contamination.

Low grade materials are usually highly absorbent and may contain substances which act as electrolytes, with the result that they are liable to fail under fairly mild conditions.

The handyman is probably the unwitting cause of most of the tracking failures which occur in domestic appliances and accessories, a loose strand of wire which has been cut and allowed to fall between terminals, or a stray strand which has not been properly wrapped round the fixing screw, can cause a flash-over which may initiate tracking, and an examination of the carbonised path will often reveal small beads or a film of copper.

Some accessories are installed in very damp situations and it is not surprising that failures should occur, as in one case which the writer

investigated in a house on a river bank, which had been subject to flooding.

Surface contamination, which may be caused by water or oil, mixed with soot, salts of various kinds, or metal dust, is often responsible for failure, and the experience reported by T.A.P. (ELECTRICAL TIMES, April 27, 1950), in connection with a three-pin plug fitted to a grinding machine, was probably due to the latter.

There are millions of phenol-formaldehyde mouldings in use which have given, and are giving, satisfactory service; many could not be replaced by amino-plastics, which have certain limitations, other than that of cost or moulding difficulties.

If the suggestion made by F. R. Haigh (ELECTRICAL TIMES, July 13, 1950) were adopted it would sound the death knell of phenolic mouldings in our industry and this would indeed be lamentable. Therefore, let us realise that as the number of cases of tracking is very small and mostly due to avoidable causes, we should not be too ready to condemn a valuable material by the application of an unsuitable test.

Each type of moulding material has its advantages and disadvantages which are taken into consideration in every well-designed product, and the cause of the electrical industry is best served by co-operation between the user and the manufacturer, by discretion in application and by avoiding the indiscriminate adoption of unsuitable or unproved tests. The provision of suitable tests may safely be left to the organised bodies who can be trusted to look after the interests of the industry as a whole.

Francis G. Dodd

WALSALL

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Manual or Technical?

MAY I draw your attention to a serious state arising within the supply industry.

At the Ramsgate conference of the Electrical Trades Union a resolution was passed calling for pay and conditions of manual workers to be raised to the level of clerical workers, a pointer to the amount of disquiet which already exists.

In one division selected skilled manual workers have been raised to staff grade, while in adjoining divisions those with greater responsibility have been denied that grade, and not even in adjoining divisions, but within the same building this difference exists.

In one department eight out of ten skilled fitters are attending evening classes to obtain their Higher National because without that certificate they cannot progress. Manual skill is of no value to an ambitious man.

The increasing number of manual vacancies points to a shortage of skilled manual workers, while the need to have served an apprenticeship restricts the possible applicants, since this system fell into disuse between the two wars.

Within a few years, if this position is allowed to continue, the industry will be faced with a serious shortage of skilled manual workers, while many present skilled men will have obtained their Higher National and transferred to the technical grades. We shall have on the one hand a shortage of skilled manual workers making it easier for the E.T.U. to implement this policy endorsed at the Ramsgate conference. And on the other hand, a glut of technical grades, making competition for the few vacancies very intense.

Many of our older men are reaching retiring age, often making a complete change of staff in a station within a matter of months. There will be few come forward to fill the manual vacancies, while many will apply for the technical vacancies.

The E.T.U. can have no interest in preventing this state of affairs since it will make it easier to implement their policy of equal pay and conditions. The Electrical Power Engineers' Association and its members have much to lose. Surely in the interest of those members efforts should be made to see that the best skilled manual workers are raised to staff grade and so prevent them from becoming technical workers, and giving others an incentive to raise their skill and efficiency as manual workers.

The only alternative is a lowering of the pay, conditions, and status of the technical grades.

Technician

SURREY

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Commutator Motors

IN your issue of July 20, Mr. D. R. N. Seed, in what was otherwise an excellent and balanced article, overlooks one obvious advantage of the stator-fed motor, i.e., its suitability for direct connection at high voltages.

J. B. Battes

BAGSHOT

Ordeal by Debate

Parliament discusses the First B.E.A. Report

THE debate on the B.E.A. Report, while by no means bright, was not as dull as newspaper accounts might lead one to believe. It was opened by the Minister of Fuel and Power in a speech which was subsequently described as "an unaggressive defence." This we interpret as a compliment since the speech was an able review of the situation.

Mr. Noel Baker reviewed the familiar factors of trials and difficulties set out in the report. He was particularly at pains to show that there had been little increase in the number of employees since nationalisation. Of the 26,000 increase, 15,000 was a paper increase only and 7,000 of the remainder were needed because of the adoption of a 44-hour week. The remaining 4,000 he suggested was due to deferred maintenance etc., a solution almost too good to be true. It was interesting to have his figure of £54 7s. for the capital cost of new generating plant; a surprisingly exact amount. He drew attention to the saving of 250 MW that had been made by the use of less unsuitable fuel and that the saving in outage time due to breakdown and maintenance had been reduced from some 15·1% in 1948 to 11·4% today. It was encouraging to see that the Minister showed a real consciousness of the peak load problem and the need to develop long hour usage with water heaters, storage radiators and battery vehicles. A particularly important item of news was his statement that the B.E.A. was especially undertaking research into storage batteries. It was unfortunate that this was not amplified. Research was also being undertaken into conduction in other storage and control devices in an attempt to improve what the Minister termed a basic nightmare problem. Finally, in speaking of the future, he summed up the position by saying that the T.V.A. was only the most dramatic example of a world-wide process.

Replying to the debate, Mr. Geoffrey Lloyd quoted extensively from Sir Henry Self's paper at the B.E.P.C. He challenged the expenditure on publicity while suggesting that the figure of £55,000 for research was insufficient. Mr. Noel Baker corrected this figure to £250,000.

Acknowledgement was made to the distinguished members of the authority, but he was struck by the fact that there was not a single person who represented purely business or managerial abilities

Mr. Tomney, advocating more fluorescent street lighting, said it was at least 1,000% more efficient than present lighting, a figure which will no doubt be of interest to E.L.M.A.

Accounting Methods

The most interesting speech for the opposition came from Mr. Pickthorn who asked the pertinent question whether the authorities were still of the opinion that it was right that generation and distribution should be as far apart from each other as they were at present. He queried whether the reserves of the B.E.A. were sufficient and whether the profit really was a profit. He said the Authority had had the advantage of paying £3 million a year less in interest and dividends and £1 million less on relief of rates. He suggested that a tax reserve fund ought to be established, particularly as the Authority had taken into the year's accounts the whole of the initial allowance on capital expenditure. Thus, in all, there was at least a financial advantage of £9 or £10 million as against pre-vesting conditions.

He referred next to the intangible assets which appear at £64 million, to which he added the £5 million which is so-called compensation for the severance loss suffered by municipalities. He asked how these figures arose and why they were to be paid off over the very long term of 90 years. Finally, he queried Section 45 of the Act, which requires the Minister to redeem the capital and depreciation of assets. The word was "and" not "or."

There was certainly nothing unaggressive about Mrs. Castle's defence of the report. She even went to the length of averring that prices of electricity have not been put up, a statement which was appropriately greeted with "Oh!" She also pointed out that the intention to return to consumers the extra revenue from the Clow surcharge was a manifestation of the honesty of nationalised industry. The only useful section of her speech was that dealing with consultative councils, in which she suggested that they should be granted greater independence, and their finances should be borne by the Minister's vote and not by the B.E.A. Similarly, the Chairman should not be a member of the Area

Board as he is at present, as this might in certain cases give rise to divided loyalties.

Mr. Parnell uttered the familiar left-wing cry that Lord Citrine's salary was too high, and this led to a structure of salaries that was fundamentally wrong. A new conception of public service was necessary amongst the executive heads, and we presume that these alone are expected to regard remuneration as a matter of indifference. Moreover, Mr. Parnell believed in the co-ordination of gas and electricity, particularly in regard to meter readings and other common services. He regarded the allocation of funds to relief of rates prior to nationalisation wrong, and in many cases fraudulent. Quite understandably, his speech terminated in a stormy interruption.

Too Much Administration

Although Mr. Erroll was astray in some of his minor figures, he had the courage to say what many in the industry have been thinking. He spoke of the frustration caused by excessive bureaucracy, and pointed out that all the emphasis of the new authority had been upon administration. It had been Self before Hacking; it was time it was Hacking before Self. He gave a useful reminder to the Government of the serious situation of distribution. The capital cuts had fallen most heavily on distribution, and this was a faulty balance since networks are heavily overloaded. He gave a warning of the possibility of disasters on heavily overloaded substations. He continued with a criticism of the over-elaborate construction of power stations, of the B.E.A.'s programme of advertising and of the slowness in technical development, particularly in the construction of very high voltage lines.

Industrial Demand

Attention was drawn to the relative position of domestic and industrial consumption of electricity by Mr. Foot. While the figures he gave were somewhat out-of-date, he stressed that it was in domestic consumption that the greatest advances were being made. The price of domestic electricity is less than before the war, but for industrial purposes it had increased by 50%. Our domestic consumption was 200 kWh per head per year, whereas in the U.S. it was 300. A different picture was shown of industrial usage, which was 400 kWh per head as against 1,000 in the U.S. This problem of the balance between domestic and industrial demand was a very real one, and it was the Government alone who could make a price policy to bring about improved productivity.

With the high capital cost of power station equipment and coal 183% higher than it was before the war, Sir Arnold Gridley said no authority, either private or nationalised, should be blamed if it had to raise prices. However, the report confirmed many of the fears that were expressed and the prophecies made by the Opposition during the passage of the Electricity Act. He criticised the lack of decentralisation and the great waste of time of senior personnel in conferences. He was particularly vehement on the question of capital cuts, and stated that it was the Minister's duty to make plain to the Chancellor of the Exchequer the grave danger that the country was being asked to face as a result of these limitations.

In this review of the debate we have omitted several contributions, some concerned with such sectional interests as rural electrification in Scotland and Wales. Consultative councils received a good deal of comment from the Government benches, and several members pleaded for better publicity amongst consumers of these consultative facilities. The super grid appeared as something of a vague symbol of progress, and needless to say Lady Megan Lloyd George could not keep quiet on the proposed water power schemes in North Wales.

The Reply

The reply to the debate was somewhat discursive, and added little useful information. In answer to a direct question, on whether rural electrification was to be cut, as a result of the limitation on expenditure, the Parliamentary Secretary to the Minister of Fuel, Mr. Robens, replied that it must rest with the Area Boards themselves to determine in what way they could get the most for the money available. In reply also to the challenge on cheap electricity, he said that under integration in this public way it would be cheaper, and "cheaper", he added, was a relative term. He followed this with specific examples of savings that had been made since vesting day. Responding to the challenge that the £4 million surplus was not a true profit, he affirmed that it was properly determined after deducting all proper revenue charges; £31 millions had been set aside for depreciation, which was greater than that provided by former undertakings, but it was recognised that this was insufficient to replace the assets at present-day prices. Thus ended the first debate on nationalised electricity. It scarcely ever varied from a level tenor and was characterised principally by a repetition of well-known viewpoints.

If it served no useful purpose, it at least did little harm, and we must be thankful that only once or twice did party politics raise its head.

Problems and Practice

IN ENGINEERING

Pumps In Parallel

UNDER the above heading in the April 27 issue, I notice your correspondent states that " . . . it is very difficult to adjust two switches to operate at precisely the same float moment."

Could not the float switches be connected in series with the starter coils connected in parallel, as shown in sketch (b)?

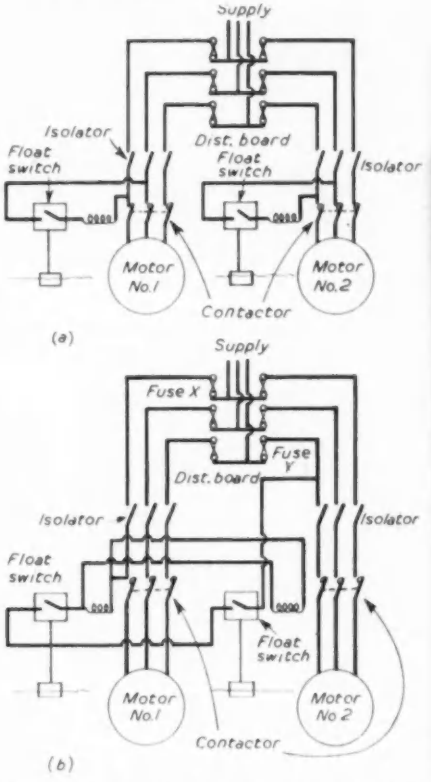
This would ensure that operation of either of the float switches would stop both of the pumps together.—*L. G. B.*

FURTHER to my note dealing with pumps in parallel in the April 27 issue. The pumps would work with the float switches connected in series as your correspondent suggests, but there are several objections to this.

The first one would probably have been clear in the first place if I had given a fully detailed diagram of connections instead of the "block diagram" which I thought would save complication as the installation followed standard practice. The actual connections are shown in the accompanying diagram (*a*). With float switches in series (dia. *b*), it will be seen that switching off one isolator will not make either starter completely "dead" if the float switches happen to be closed. This is bad practice and a potential source of danger.

A further objection is that with the float switches wired in series, the fault which I described in my note (non-return valve sticking) would not have shown itself. Every time the pumps were stopped, all the water in the rising disposal pipe would be allowed to run back into the tank. As the pipe had a gradual rise for a distance of 200 yd or so, a large amount of water would run back and, over a period of time, the waste of power would be considerable.

Yet another objection is that a fault on one pump circuit may cause *both* pumps to shut down. For instance, if a fault on No. 1 circuit caused fuse X to blow, or a fault on No. 2 circuit caused fuse Y to blow, both pumps would be put out of action. This could, of course, be overcome by using a separately fused circuit for the contactor coils, but this would seem to unnecessarily complicate the job and increase the cost of installation.



Circuit diagram for alternative pump and float switch connections

Finally, why connect two float switches in the same tank in series? As both switches must close before the pumps can operate, one switch could be dispensed with under this system!-*J.G.*

Fishing Wires Behind Partitions

WHEN wires have to be fished behind partitions and over ceilings, it is usually impossible to get the wires without a great deal of trouble. The operation can be made much easier if the ends of the wire being sought are

bound with steel wire and a magnetised stout steel wire used for fishing. The wires will become much more easily attached. The same applies when drawing in cables in conduit. If the end of the draw wire used is magnetised and the ends of the wires being drawn in are bound with steel wire, it will usually be possible to make a connection with the broken wires. Although the strength of the magnetic connection made may not be strong enough to pull the wires through, it will suffice for the cables to be drawn back and the draw wire pulled through with them and a fresh connection made.

A magnetic connection does not dispense with the usual form of mechanical connection. The pull needed to pull a draw wire back under these circumstances is not great, the joint made, while necessarily not strong, is strong enough for this. The whole draw wire is not magnetised; in my experience the last draw wires consist of stout copper wire insulated. At the draw-in end, the wires are made into a ring, the joint being well soldered. The wires to be drawn in are threaded through this and soldered.

In the wires to be drawn in is placed about two pieces of soft iron soldered in, and through the ring of the draw-in wire is placed a piece of magnetised steel forged to the shape of a link. This joint must be carefully made to avoid over-rigidity and too large a size, but the space required by the magnetic materials is small and with care they can be so placed as to be shielded from any magnetic effects of the conduit.—*W. E. W.*

Quarry Faults

RECENTLY I experienced a fault, which proves that regular inspection is necessary to prevent fatal accidents.

My information was that a single line telephone between a quarry office and the local railway siding, 2 miles distant, was continually ringing and the receiver at railway end was alive and hot. While investigations were in progress a second message informed me that a workman had received a nasty shock in a building near the quarry office and fed from same overhead mains, which were phase, neutral and continuity earth wire. This was a surprise, as no leakage had been brought to my notice on switchboard. On tracing through, the continuity wire was found to be broken, explaining why shock had been received, but the actual fault was untraced, and bells were still ringing. Megger tests showed that phase was earthed and attention was finally drawn to some watertight fittings and switches which were conduit piped and connected to the continuity wire. The fuse on examination had been replaced by Mr. Nobody, and was good enough for at least 60 amp. One switch was found to be hot, and on opening it was found to be full of water; this was fault cleared, but why did bells ring?

I must now give a few local details, the fittings and switches already mentioned were on a pole for yard lighting, this same pole also carried the telephone earth, earth connection was of high resistance, this explaining the bell ringing and instruments warming up.—*R.C.W.*

Dynamo Trouble

I RECENTLY had a motor-cycle dynamo to repair, and the owner informed me that it had been generating intermittently for a week or so, but that it had now failed completely. On examination of the machine it was found to be in poor condition, and it was cleaned up in general, the field circuit and brush gear were tested and found to be sound, the armature was drop tested and the readings were uniform, it also had an infinity reading to earth. I came to the conclusion that the trouble was bad commutation, so the commutator was undercut and cleaned and new brushes were fitted, the machine was then reassembled and put on test. It generated well above 6 volts on open circuit, but when loaded the voltage dropped rapidly, so it was taken down again and once more thoroughly tested. No fault could be found. I came to the conclusion there must be trouble of some sort on the armature, caused by slight warming up or centrifugal force on the windings. The armature was again drop tested, but this time with twice the normal load carried by the armature placed in the circuit. The armature warmed up slightly after a few minutes, until then the readings were uniform, but after the rise in temperature two low readings were recorded on consecutive segments, the string binder was removed behind the commutator and after very careful inspection of the windings behind the offending bars, trouble was detected. The connections were unsweated and lifted from the segments, the leads had been shorting on the coil ends; these were well insulated, and sweated back in the bars. The string binder was renewed, the machinery assembled and put on test; it performed perfectly and has been running successfully on the motor-cycle ever since.—*E. C.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

3 AUGUST, 1950

Beverley Minster

Lighting Installation Completed

THE installation at Beverley Minster, first described in the ELECTRICAL TIMES for July 7, 1949, has now been completed by the addition of the choir lighting fittings. This installation has created interest as far off as Australia.

The main lighting is carried out with 5 ft warm white fluorescent tubes which, as described in our previous article, are located between adjacent shafts of the pillars. In all 72 fluorescent tubes are used, the entire installation in the nave, aisles and transepts being controlled from the verger's pew.

Wiring is in mineral insulated metal-sheathed conductor, which was selected as being most suitable and unobtrusive for this particular installation. The cables generally are run through existing ducts in the floor while the rising cables feeding individual lighting points are most conveniently concealed in the shafts of the pillars. All cables run on the surface were given a coat of Cleveland Stone paint to match the surrounding stonework, rendering them quite inconspicuous.

Choir Fittings

The choir lighting fittings, of which there are six in all, were specially designed and made by Mr. S. J. Kerrswill, A.R.C.A., of the Regional College of Arts and Crafts, Hull. They consist of oak standards supporting octagonal bronze vase-shaped fittings, each of which contains a 200-watt lamp. The flat octagonal reflector, having its internal surface rendered matt-white, contains diffusing glass on its lower side, while ventilation is provided by a series of holes which permit a current of air to pass through the fitting. Each fitting is controlled separately by a switch located below the book-rest of the choir stall.

General view of the choir stalls

Lighting reveals ornate carving of choir stalls

These special fittings are, of course, designed to be in keeping with the supporting columns of the canopies and tabernacle work above the rear choir stalls which date from the early part of the sixteenth century and form a magnificent example of ancient woodwork.

Control Equipment

The main switchboard for the installation consists of a polished bakelite panel on which is engraved in white a plan of the Minster showing the location of all the lighting fittings. Switches are mounted on the panel to indicate the lighting fittings they control, and it is thus possible for any combination of lights to be readily selected. This panel is mounted on an angle iron frame and all cables enter through the bottom of the switchboard. Master switch-fuses and associated distribution boards are fitted underneath the panel. On the right are fixed the controls for the sound equipment.

All work in connection with the design and execution of the lighting installation was carried out by the staff of No. 6 (Hull) Sub-Area of the Yorkshire Electricity Board.

Cable Fault Location

Theoretical considerations of the methods in use

by J. G. BOGGIS, A.M.I.E.E., G.I.Mech.E.

MANY of the methods proposed for fault location on power cables are based on Murray's Loop test. An examination of these methods reveals a family of common origin.

The object of this article is first to establish a test of great generality; and second, to assign specific values to the variables for the special cases that arise in practice.

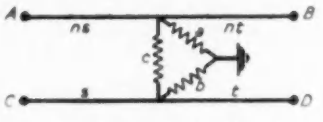


Fig. 1.—A generalised fault

Consider the power cable in Fig. 1, which has leakage paths to earth *a* and *b*, and a leakage path between the cores *c*. These fault paths form a Delta system which can be transformed into the equivalent Star system *e*, *f*, *g* in Fig. 2. Furthermore, to consider a general case, the resistance of the conductor A—B will be assumed to be *n* times greater than the resistance of C—D.

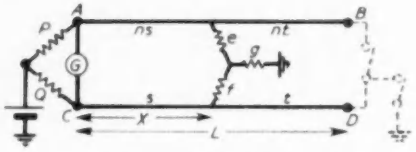


Fig. 2.—Open, closed, and earthed

Testing from the A end, three balances are made with the B end:

(1) Open and insulated from earth.
(2) Closed and insulated from earth.
(3) Closed and solidly connected to earth.

In these tests, earth is the metallic sheath of the cable.

Test (1).—Open.

$Q_1 \cdot e = P_1 \cdot f$ neglecting the conductor resistances as small in comparison with the fault resistances.

$$\text{Bridge ratio } N_1 = \frac{Q_1}{P_1 + Q_1} = \frac{f}{e+f} \quad \ldots\ldots\ldots\ldots (1)$$

Test (3).—Closed and Earthed.

$Q_3 \cdot n(s+t) = P_3(s+t)$ neglecting the fault resistances as large in comparison with the earth connection.

$$\text{Bridge ratio } N_3 = \frac{Q_3}{P_3 + Q_3} = \frac{1}{n+1} \quad \ldots\ldots\ldots\ldots (3)$$

Test (2).—Closed, not earthed.

$$Q_2\left(ns + \frac{e}{e+f} \cdot (n+1)t\right) = P_2\left(S + \frac{f}{e+f} \cdot (n+1)t\right)$$

The Delta system formed by the faults *e* and *f* and the closed loop are converted into an equivalent Star in Fig. 3. In the balance equation the conductor resistance has been neglected as small in comparison with the fault resistances.

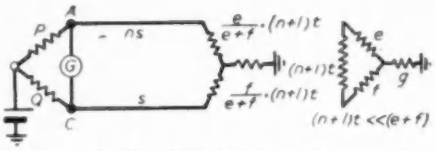


Fig. 3.—Star-delta conversion

From (1) and (3):

$$Q_2\left((1-N_3)S + (1-N_1)t\right) = P_2\left(N_3 \cdot S + N_1 \cdot t\right)$$

$$N_2 = \frac{Q_2}{P_2 + Q_2} = N_3 \cdot \frac{S}{S+t} + N_1 \cdot \frac{t}{S+t} = N_3 \cdot \frac{X}{L} + N_1 - N_1 \cdot \frac{X}{L}$$

$$\frac{X}{L} = \frac{N_2 - N_1}{N_3 - N_1} \quad \ldots\ldots\ldots\ldots (2).$$ Fig. (2)

where L is the single route length.

The following assumptions are implicit in the argument:—

(*a*) That the faults are coincident, and the cable sound elsewhere.
(*b*) That the fault resistances are stable.
(*c*) That the faulty cores are continuous and contained in the same cable.

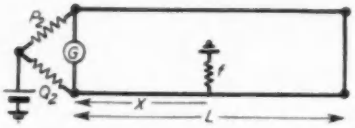


Fig. 4.—*Murray's Loop*

(*d*) That the fault resistances are considerably greater than the conductor resistances or earth path resistance.

The test fails if $N_1 = N_3$, or they approach equality.

Special Values.

e = infinity	$N_1 = 0$	Core A—B sound.
f = infinity	$N_1 = 1$	Core C—D sound.
e = f	$N_1 = \frac{1}{2}$	Equal fault resistances to earth.
n = 1	$N_3 = \frac{1}{2}$	Equal cores.
n > 1	$N_3 < \frac{1}{2}$	Core A—B smaller section.
n < 1	$N_3 > \frac{1}{2}$	Core C—D smaller section.

Test (4).—Closed, not earthed, at A end.

The repetition of tests (1), (2) and (3) at the B end does not give three new ratios. The ratios N_1 and N_3 are maintained irrespective of the test position. But taking care to connect the bridge in the same manner to correctly identified cores, repeating test (2) gives a new ratio N_4.

$$N_4 = \frac{Q_4}{P_4 + Q_4}$$

From (2) $$\frac{L - X}{L} = \frac{N_4 - N_1}{N_3 - N_1}$$

$$\frac{X}{L} = \frac{N_3 - N_4}{N_3 - N_1} \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$ Fig. (2)

where X is measured from the A end.

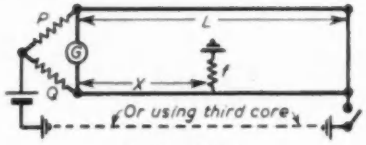


Fig. 5.—*Fisher*

Relation between Ratios.

From (2) and (4):

$$\frac{X}{L} \cdot \frac{L}{X} = \frac{N_2 - N_1}{N_3 - N_1} \cdot \frac{N_3 - N_1}{N_3 - N_4} = 1$$

$$N_3 + N_1 = N_2 + N_4 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Special Cases.

By assigning to N_1 and N_3 the special values given in the table, the expressions (2) and (4) reduce to the special cases that arise in practice.

(*a*) $N_1 = O$, $N_3 = \frac{1}{2}$, *Equn.* (2).

$$\frac{X}{L} = \frac{N_2}{\frac{1}{2}} = 2N_2 \quad \ldots\ldots\ldots$$ Murray's Loop. Fig. (4)

(*b*) $N_1 = O$, N_3 *to be determined, Equn.* (2).

Fig. 6.—*Murray—both ends*

$$\frac{X}{L} = \frac{N_2}{N_3} \ldots$$ Fisher, with earth return. Fig. (5)

This test may also be carried out using a third core of any section.

(*c*) $N_1 = O$, N_3 *unknown, Equns.* (2) and (4).

$$\frac{X}{L} = \frac{N_2}{N_3} = \frac{N_3 - N_4}{N_3}$$

Eliminating N_3 we have:

$$\frac{X}{L} = \frac{N_2}{N_2 + N_4} \ldots\ldots$$ Murray, from both ends. Fig. (6).

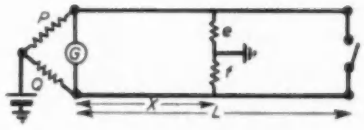


Fig. 7.—*Open and closed*

(*d*) $N_3 = \frac{1}{2}$, $N_1 \neq \frac{1}{2}$, *Equn.* (2).

$$\frac{X}{L} = \frac{N_2 - N_1}{\frac{1}{2} - N_1} \ldots\ldots$$ Open and Closed. Fig. (7)

(*e*) $N_3 = \frac{1}{2}$, $N_1 \neq \frac{1}{2}$, *Equn.* (2).

$$\text{Let } N_2 = \frac{Q_2}{P_2 + Q_2}, \quad N_1 = \frac{f}{e + f}$$

$$\frac{X}{2L} = N_2 - (1 - 2N_2) \cdot \frac{f}{e - f}$$

$$\frac{X}{2L} = \frac{Q_2}{P_2 + Q_2} - \left(\frac{f}{e - f} \cdot \frac{P_2 - Q_2}{P_2 + Q_2}\right) \quad e \neq f$$

Murray, with insulation correction. Fig. (7)

(*f*) $N_1 \neq N_3$, *Equns.* (2) and (5).

(5) $N_1 = N_3 + N_4 - N_2$

(2) $$\frac{X}{L} = \frac{N_2 - N_1}{N_3 - N_1} = \frac{N_2 - N_3 - N_4 + N_3}{N_2 - N_2 - N_4 + N_3}$$

$$= \frac{N_4 - N_3}{N_2 + N_4 - 2N_3}$$

Werren, with unequal conductor sections.

Letting $N_3 = \frac{1}{2}$, for the case of equal conductor sections, we have:

$$\frac{X}{L} = \frac{N_4 - \frac{1}{2}}{N_2 + N_4 - 1} \ldots\ldots\ldots$$ Werren. Fig. (8)

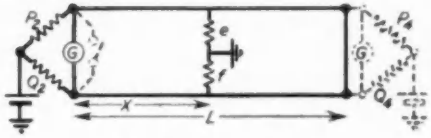


Fig. 8.—*Werren's test*

Value of N_3—Conductor resistance unbalance. The value of N_3 may be determined by several methods, as follows:

(1) Fisher's connection using an earth return, when the fault resistance is high compared with the earth return path, see Fig. (5).

(2) Fisher's connection using a third sound core of good insulation and any section.

(3) Fisher's connection using a third faulty but continuous core of any section, when the fault resistance is high compared with the conductor resistance.

(4) By calculation from the known sections of the cable loop.

Practical Application.

For the practical application of these tests, the reader is referred to: Siemen's Engineering Bulletin, June, 1945. "Localisation of Faults in Underground Cables," by J. L. Greatorex.

NEW LITERATURE

Classified Examples in Electrical Engineering, Vol. 2, A.C.

by S. Gordon Monk, M.Sc.(Eng.), B.Sc., M.I.E.E.

LITTLE change has been made in preparing the sixth edition of this well-known book. In it a wide range of problems applying to the "power" side of electrical engineering are collected in groups corresponding to various sections of the subject, and are accompanied by a summary of relevant formulae and a useful set of references to text books and original papers. Answers are supplied to the numerical and graphical parts of the questions, which are mainly taken from examination papers for the London B.SC.(ENG.) degree, the I.E.E. membership and the City and Guilds final certificate. Published by Pitman, 205 pages, 7¼ in. by 4¼ in. Price 8s. 6d.

Electric Lamps

HOW and why of lamps for electrical men—that is the object of this excellently produced and illustrated volume which is packed with helpful information on all aspects of its subject. The early chapters are devoted to an historical survey and to certain basic facts about light and about lamp manufacture. The development and technical details of filament lamps are then treated, while the various types of discharge lamps, including tubular fluorescent, receive similar treatment. Finally, there is a short section on lamp economics and a series of tables setting out useful lamp data. There can be few electrical engineering libraries to which this volume would not be a valuable addition. Published by the Lighting Service Bureau, 2 Savoy Hill, London W.C.2, 147 pages, 8½ in. by 5½ in.

Scope Year Book, 1950

A NEWCOMER to the field of reference books, by its comprehensiveness this volume should attract many adherents, for it provides a wealth of industrial, financial and economic information in a readily assimilable form. It is divided into three sections, the first comprising a review of British economy in 1949 including a calendar of events of the year. Part II concerns facts for reference, such as Government Departments, details of nationalised undertakings, trade associations, trade unions, chambers of commerce, specialised journals, and banks, together with key facts concerning overseas countries. The third section is devoted to statistics such as national income, expenditure, industrial production, manpower, and foreign trade, in addition to a useful guide to sources of more detailed information. An index completes the volumes. Essentially a work for the business man, this new publication should fill a gap in many reference libraries. Published by Scope Books Ltd. 645 pages, 8¾ in. by 5¼ in. Price 45s.

BOOKS RECEIVED

The Computation of Heat Requirements for Buildings. Revised edition. Published by the Institution of Heating and Ventilating Engineers, 75 Eaton Place, London S.W.1, 47 pages, 8½ in. by 5¼ in. Price 3s.

Electronics in Engineering, by W. Ryland Hill. For engineers who apply electronics to their own field of study. Published by McGraw-Hill, 274 pages, 9 in. by 6 in. Price 30s.

The Practical Electrical Reference Book, edited by Jacobi and Bevan. Briefly covers the whole field of electrical engineering. Published by Odhams, 384 pages, 8½ in. by 5½ in. Price 9s. 6d.

Electrical Engineers Handbook—Electrical Power, by H. Pender and W. A. Del Mar. Comprehensive handbook of U.S. practice. Published by Chapman and Hall,1700 pages, 8½ in. by 5½ in., 4th edition. Price 68s.

Rural Electrification Engineering, by U. F. Earp. Written for use by American undergraduates studying agricultural engineering. Published by McGraw-Hill, 313 pages, 9 in. by 6 in. Price 30s.

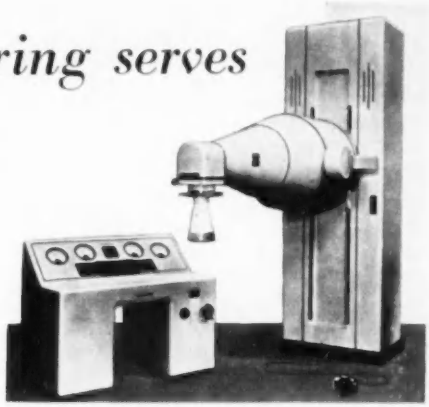
Alternating Current Motor Windings, by H. Hopwood. Practical and theoretical study. Published by George Newnes, 320 pages, 8½ in. by 5½ in. Price 25s.

British Inventions, by F. Sherwood Taylor. Published for the British Council by Longmans Green, 44 pages, 8½ in. by 5½ in. Price 1s.

Application of the Electronic Valve in Radio Receivers and Amplifiers—Book IV, by B. G. Dammers and others. Detailed study. Published for N. V. Philips by Cleaver Hume Press Ltd., 43a South Audley Street, London W.1, 416 pages, 9 in. by 6 in. Price 35s.

Electrical Engineering serves Medical Science

INTERESTING X-RAY EXHIBITS AT RADIOLOGY CONFERENCE



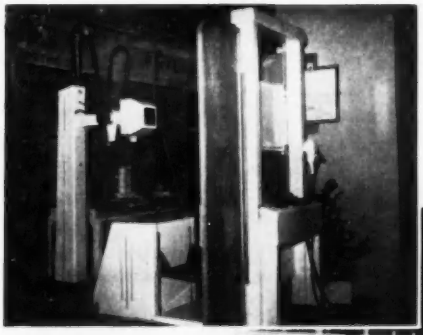
ALTHOUGH the medical aspect of X-ray work formed the subject of the Sixth International Congress of Radiology, and also of the accompanying Technical Exhibition, electrical engineers visiting the Horticultural Halls where the show was staged last week found much to interest them. The foremost impression was of compact design for apparatus operating at high peak voltages, and also of an unusual combination of heavy and light engineering skills in the construction of the larger X-ray units and their very stable positioning apparatus.

Outstanding in this respect was the 300 kV peak "Resomax" deep X-ray therapy unit shown by Newton Victor Ltd. (in association with Metropolitan Vickers Electrical Co., Ltd.). This apparatus, which is shown in the illustration at the top of the page, stands 5 ft. 7 in. high, and includes in the projecting tube head a 1,000 c/s resonant transformer.

Somewhat similar in their economical utilisation of space and massive steadiness were the 250 kV deep therapy units shown on other stands by Marconi Instruments Ltd., Philips Electrical Ltd., and Watsons and Sons (Electromedical) Ltd. This last firm, which is associated with the General Electric Co., Ltd., also exhibited a new high voltage cine-radiography apparatus.

Tubes and Valves

Several firms showed examples from their range of X-ray tubes and h.v. rectifying valves. Mullard Electronic Products, Ltd., for instance, exhibited rotating anode oil-immersed X-ray tubes, stationary anode types for use up to 120 kV and both oil-immersed and air insulated rectifiers. The Dutch parent company of Philips included high-tension rectifying valves with thoriated tungsten filaments, which have a very high emission for a low filament voltage. Newton Victor Ltd. included in their selection a rectifier of the type used on the Metropolitan-Vickers electron microscope.



A Philips' mass X-ray unit is shown above, while on the right is a general view of the New Hall exhibition

Amongst other interesting exhibits were noted ionisation and dosage meters (Baldwin Instrument Co.) and a special electro-encephalograph (Edison Swan Electric Co., Ltd.).

overseas news

Locos for Thailand

Electrical equipment for 45 diesel-electric locomotives has been ordered by the National Railways of Thailand, from the Westinghouse Electric International Co. Deliveries, scheduled to begin in January, 1951, will comprise traction motors, controls, generators, gears and pinions for 15 78-ton passenger locomotives and 30 53-ton freight locomotives. The units will replace steam locomotives destroyed or confiscated by the Japanese in the last war. They will serve some of the richest rice-growing areas in South-East Asia over about 2,100 miles of track radiating from Bangkok.

Commission's Deficit

The State Electricity Commission of Victoria expects its deficit for the past financial year will prove to be at least £250,000. The exact figure cannot be given because accounts have not yet been completed. Revealing this a few days ago, the chairman, Mr. R. A. Hunt, said that at least one-third of the deficit would be due to the loss on the Commission-controlled tramways at Ballarat, Bendigo and Geelong.

Using Fly Ash

In Australia now, efforts are being made to put fly ash to good use. The Public Works Department of Perth, W.A., has been carrying out experiments, some details of which were given a few days ago by the hydraulic engineer of the department, Mr. V. C. Munt, and Mr. D. C. Munro. It was said that by replacing 25% of cement with fly ash, concrete was made more watertight and its chemical resistance to attack by sea water or sewer gases was increased. The concrete was easier to work and pack, and the cost of the product was reduced. The addition of 25% fly ash reduced the early strength of the concrete, but at the end of 9 to 12 months the concrete was as strong as concrete made without fly ash. The Public Works Department had been using fly ash during the past 12 months on a number of works and, altogether, 600 tons had been used. At present, available production of fly ash in W.A. was about 20 tons a week, but when the South Fremantle station was in operation it was believed that the ash would be used in larger works, such as concrete dams.

New H.V. Line

The Hydro-Electric Commission of Tasmania has decided to run a new 22,000 V line from Derby to Scottsdale. The new line is necessary because it is still not known when the transformers supplying the Scottsdale district will be repaired. It will be carried by the existing towers, which have provision for a duplicate line.

A Log Problem

In the construction of a large hydro-electric project many awkward problems are frequently met. Thus at the Des Joachims power project, second largest in Ontario, which was opened a few weeks ago by the Hydro-Electric Power Commission of Ontario, the problem besetting its builder was what to do with the logs, valued at some millions of dollars, which floated each year down the Ottawa River to the big pulp mills farther down. The idea was not merely to pass them safely across the new dam, but to do so without delay, and with as little loss of water as possible. After examining various chutes already in use elsewhere, and much experimenting, hydro engineers evolved a scheme which seems to have solved the problem, for at the official opening of the station, fascinated visitors watched logs, sometimes singly, sometimes in groups, drift leisurely to the throat of the chute, hurl themselves down the 1,100-ft toboggan slide in a smooth rush of water, then out into the river and away. The chute is of structural steel, and embodies a unique feature, a disappearing gate, which is raised or lowered as needed, to control the manner in which the logs pass into the chute.

Ontario's Big Clock

What is claimed to be the world's largest electrical floral clock has been built at the Queenston power plant of the Hydro-Electric Power Commission of Ontario. With a face diameter of 38 ft, the sweep second hand, weighing 250 lb, travels 8 ft a second, while the minute hand, 15 ft long and the hour hand, 12 ft long, each weigh 500 lb apiece. Later this summer a 12 ft tower is to be erected nearby to house loudspeakers to amplify the chimes as the quarter, half and hour notes are struck.

German Radio Output

About 1,400,000 radio receiver sets were produced in West Germany during 1949, roughly equivalent to the outputof 1938, it was announced recently. Since production was resumed after the end of the war, prices for receiving sets have decreased by about 50%.

Radio Telephony on Rhine

Ultra-short wave radio-telephonic services between Rhine shipping and on-shore subscribers is now available on the whole stretch of the Rhine from Mannheim to the frontier, following the completion of the Rhine radio-telephony station at Wesel. Stations at Mannheim and Ruedesheim have been in operation for some time, and that at Cologne will be ready shortly.

Geothermal Hopes

Authority has been given by the New Zealand Cabinet for the spending of £80,000 this year on investigations of thermal regions in the North Island to ascertain whether underground steam can be used for the generation of electric power and other purposes. Exploratory work has been in progress for some time. The Works Department, the State Hydro-Electric Department and the Department of Scientific and Industrial Research are all interested in the work which is being carried out in the Wairakei thermal region, near Taupo. More than 50 men are engaged in sinking bores to test the steam supply and pressure.

The Government expects to learn within twelve months whether geothermal steam is a practical source of power generation in New Zealand. It therefore considers it prudent to await such investigations before embarking on a programme of developing other types of fuel-driven auxiliary plant, the Minister of Works, Mr. Goosman, has told the Central Waikato Electric Power Board.

The N.Z. Outlook

Following a discussion in future power prospects, representatives of power supply authorities in the Auckland Province are urging the New Zealand Government to make immediate investigations of three suggested schemes for overcoming "dry weather" power shortages and to proceed with whichever will provide relief before 1955. The proposals are : (1) increasing the storage of Lake Taupo; (2) accelerating hydro-electric development by outside contract, and (3) installing 120,000 kW of steam plant. The representatives considered a report in which it was estimated that even with all planned hydro-electric projects executed there would be a deficiency of about 160 million units, which would have to be met either by steam or geothermal plants. If the King's Wharf station was extended by 30 MW a new station or stations of 90 MW would be needed by 1955. The report recognised the magnificent efforts being made by Government departments to cope with the situation. A resolution was passed congratulating the Minister on his work with geothermal investigations and the proposed extension to King's Wharf, but urging more steam plant and overseas contracts for their investigation and building.

Extensions at Salisbury

Extensions to Salisbury, Southern Rhodesia, power station, at an estimated cost of £583,000, were approved by the City Council a few days ago. A link is to be made with the Umniati power station, where 20 MW machines are being installed, and the Council had been asked by the Electricity Supply Commission of Southern Rhodesia to consider the installation of 20 MW machines at Salisbury in place of the 15 MW sets earlier proposed. To this the Council has agreed, and as a result a further £379,000 is to be spent on Stage 2 development of the station.

Bloemfontein Extension

The Bloemfontein City Council is inviting tenders for the supply of electrical equipment for the new power station, which will be built on the grounds now occupied by the spray-ponds serving the present power station. The equipment includes two stoker-fired boiler plants. Plans for the new building have not yet been finalised, but when it is completed, it will house 70,000 kW of plant. Initially there will be two boilers and a turbo-alternator with a capacity of 10,000 kW.

Rhodesia Plan

The Que Que Town Council, Rhodesia, last month decided, on a recommendation of its general purposes committee, to ask a firm of electrical engineers to prepare a detailed scheme for the re-organisation and planning of the town's electricity distribution system, and an estimate of the cost. The town has undergone tremendous expansion of late. Indicative of this is the increase in the electricity demand. In the year 1938/39 an average of nearly 170,000 units were supplied each month in the municipal area. This consumption rose steadily until 1947/48, when 703,556 units per month were consumed. In the past year, however, consumption has risen steeply to over 1,705,000—a rise of 142% over 1947/48. There are now about 1,800 consumers.

Bulawayo Increased Output

Output of the Bulawayo power stations during the month of June amounted to over 14 million units, more than 2 million above the April figure.

New U.S. Carbon Black Factory

J. M. Huber Corporation, of Brooklyn, New York, has decided to build a new furnace carbon black plant near Baytown, Texas, at a cost of 1,500,000 dollars. This was announced recently by Mr. H. W. Huber, President of the Corporation. The plant, which will have an annual capacity of 30 million pounds of carbon black, is expected to be completed by next March.

Brazil Orders from America

A 13,500-kilowatt unit which will serve as both generator and motor has been ordered by the Sao Paulo Tramway, Light and Power Company, the Westinghouse Electric International Co. announce. The 240,000 dollar machine will be installed in the Brazilian company's Pedreiras power station beside a unit of similar capacity, supplied by Westinghouse in 1940.

During periods of ample water supply, the vertical waterwheel machine will generate electrical energy for Sao Paulo and the surrounding area. In dry periods it will function as a motor to drive pumps which raise water into the Pedras reservoir. From this point the drop is more than 2,200 ft to the Cubatao power station, largest of the Sao Paulo company's installations.

PERSONALITIES

IN THE INDUSTRY

Thorn Electrical Industries, Ltd. have appointed **Mr. L. Ruda** as sales manager (home and overseas) of their "Mary Ann" domestic appliance division. For some time he has been concerned with the company's export of radio and domestic appliances, and he only recently returned from a successful business trip to New Zealand, Australia, Malaya, Burma, Siam, India and Pakistan. He has been associated with the industry since 1929.

Mr. L. Ruda

Mr. R. C. Ford, who was until recently with the Blackburn and General Aircraft Co., at Feltham, Middlesex, has now joined Multicore Solders, Ltd., as assistant works manager, at their Slough factory.

Resigning his directorship of the Queensbury Engineering Co., Ltd., **Mr. F. C. Jarvis** has joined the Atlas Lighting Division of Thorn Electrical Industries, Ltd. He was for five years with Smart and Brown, as contracts manager.

Tuesday of last week saw the inaugural ceremony of the new Long Service Benefit Scheme for staff and employees of Southern United Telephone Cables Ltd. at the Dagenham Works. After reviewing the progress of the company since its inception and that of its predecessor, the Union Cable Co., in 1912, **Mr. W. F. Bishop,** C.B.E., chairman of the company, presented £20 of Savings Certificates to each of 78 employees of 20 years, or more, service with the firm and its associates. Some 10% of employees already qualified for the Long Service awards, and within the next five years a further 10% will also qualify. At the ceremony, **Mr. A. F. Lampitt,** general manager, congratulated Mr. Bishop, who has completed 55½ years' service in the telephone cable industry, believed to be unique, at least so far as those at present actively engaged were concerned. The firm's first Long Service Certificate was thereupon presented to Mr. Bishop.

Mr. W. A. May, export manager of Berry's Electric Ltd., has sailed for America to supervise the erection and management of Berry's stand at the First United States International Trade Fair, to be held in Chicago from August 7 to 20.

In our note last week concerning **Mr. C. E. D. Greenhalgh,** M.I.E.E., who has been asked to act as part-time adviser on street lighting and other electrical matters to the Ilkley U.D.C., we should have made it clear that he retired from the service of the Yorkshire Electricity Board last year.

To mark his retirement from the Aldershot electricity undertaking, a complimentary lunch was recently given to **Mr. L. W. George,** A.M.I.E.E., at which a presentation was made on behalf of his colleagues, the district managers, the officers and manager of No. 3 sub-area of the Southern Electricity Board. Mr. George served an apprenticeship with the Powell Duffryn Steam Coal Co., and in 1913 joined the Llandridod Wells Electric Light and Power Co. as an assistant engineer. He went to Aldershot in 1915 as a shift engineer in the War Department's generating station, a position he occupied till February, 1919. He then became charge engineer at the West Ham power station, and later in that year was appointed chief assistant electrical engineer with the Horsham U.D.C. In 1921 he returned to Aldershot as deputy borough electrical engineer and manager, being promoted to the major post in 1937, a position he held till vesting day, when he became district executive officer. Mr. George has served on the Executive Committee of the A.M.E.E., No. 11 District Joint Committee, for eleven years, and was chairman of the Southern Centre, A.M.E.E., for 1949/50.

Mr. L. W. George, in dark suit, with Mr. E. A. Logan on his left, and other district and sub-area officials.

Canadian engineering professors during their visit to Stafford

Ten Canadian engineering professors who are in this country as guests of the British Government, visited the Stafford works of the English Electric Co. Ltd. on Wednesday of last week. The visitors are: **Prof. A. E. Macdonald, Prof. J. W. Porteous, Prof. W. O. Richmond, Prof. G. A. Wallace, Prof. C. F. Morrison, Prof. H. Gaudefroy, Prof. H. G. Conn, Prof. L. P. Bonneau, Prof. J. A. Wedgwood,** and **Prof. J. O. Dineen.** At the E. E. Stafford Wks, the party were keenly interested in the British methods and techniques. Our illustration shows a group of the visitors interested in one of the processes. Onlookers include Mr. J. Rogers, general manager of works, second from left (standing), Prof. Porteous (third from right), and Prof. Bonneau (second from right).

The President of the Institution of Electrical Engineers, with the approval of the Council, has nominated 45 persons to constitute the panel provided for by Section 9 subsection (2) of the Wireless Telegraphy Act, 1949. From this panel, the Postmaster-General has appointed two advisory committees. The first of these, of 17 members, he will consult before making regulations for prescribing the requirements to be complied with in the case of the ignition systems of certain internal combustion engines. The second, an advisory committee of 18 members, he will consult before prescribing requirements to be complied with in the case of refrigeration apparatus. The requirements in each case will be designed to ensure that the apparatus concerned does not cause undue interference with wireless telegraphy.

Sir Stanley Angwin

The members of the first committee (Ignition systems) are:—Col. Sir A. Stanley Angwin, K.B.E., D.S.O., M.C., T.D., B.SC.(Eng.), M.I.E.E. (Chairman); Mr. A. H. Ball, A.M.I.E.E.; Mr. H. Bishop, C.B.E., B.SC.(Eng.), M.I.E.E.; Mr. S. R. Burbidge; Sir John Dalton, A.M.I.E.E.; Mr. W. J. Edwards, B.SC.; Sir Peirson Frank, M.I.C.E., F.R.I.C.S.; Mr. P. Gratwick, A.C.I.S.; Professor Willis Jackson, D.SC., D.Phil., M.I.E.E., F.Inst.P.; Mr. E. M. Lee, B.SC., M.I.E.E.; Dr. H. E. Merritt, M.B.E., D.SC.(Eng.), M.I.Mech.E.; Mr. E. L. E. Pawley, M.SC.(Eng.), M.I.E.E.; Mr. N. E. Rowe, C.B.E., B.SC., F.R.Ae.S.; Mr. G. F. Sinclair, C.B.E., M.I.E.E.; Mr. T. M. H. Stubbs; Mrs. C. Renton Taylor; and Dr. S. Whitehead, Ph.D., M.A., M.I.E.E.

The members of the second committee (Refrigeration apparatus) are:—Dr. F. T. Chapman, C.B.E., D.SC.(Eng.), M.I.E.E. (Chairman); Mr. E. G. Batt; Mr. A. H. Bennett, M.I.E.E.; Mr. J. I. Bernard, B.SC.Tech., M.I.E.E.; Mr. J. S. Boyd; Mr. A. H. Cooper, B.SC.; Mrs. M. Courtney, J.P.; Mr. W. J. Edwards, B.SC.; Mr. J. Flood, Assoc. I.E.E.; Mr. F. Gratwick, A.C.I.S.; Dame Caroline Haslett, D.B.E., companion I.E.E.; Mr. T. H. Kinman, M.B.E., M.I.E.E.; Mr. D. A. Maurice, A.M.I.E.E.; Mr. G. F. Peirson, M.I.E.E.; Mrs. C. Renton Taylor; Mr. C. J. Veness; Mr. C. O. Watson, M.I.E.E.; and Capt. F. J. Wylie, R.N.(ret.).

Other persons on the panel, on whom the Postmaster-General may call when regulations in respect of other apparatus are to be framed, are: Dr. T. E. Allibone, D.SC., Ph.D., F.Inst.P., M.I.E.E.; Dr. P. Bauwens, M.R.C.S., L.R.C.P.; Mr. J. R. Beard, C.B.E., M.SC., M.I.C.E., M.I.E.E.; Mr. C. M. Cock, A.M.I.Mech.E., M.I.E.E.; Mr. R. L. H. Ewin; Dr. J. S. Forrest, M.A., D.SC., M.I.E.E.; Capt. C. Higgins, O.B.E., B.SC.(Eng.), M.I.E.E.; Mr. M. O'C. Horgan, M.I.E.E.; Mr. W. J. Jones, M.SC.(Eng.), M.I.E.E.; Mr. C. W. Marshall, B.SC., M.I.E.E.; Mr. C. Riley, B.SC.(Tech.), A.M.I.E.E.; Mr. C. N. Rocky; and Mr. W. Thomson, B.SC., A.M.I.E.E.

A former Minister of Fuel and Power, **Major the Hon. Gwilym Lloyd George, P.C.,** has joined the board of directors of the Superheater Co., Ltd.

OBITUARY

One of the original members of the Batti-Wallah's Society, **Mr. J. V. Avila,** A.M.I.E.E., A.M.I.Mech.E., died recently, aged 70. He was for some years with Callender's Cable and Construction Co., Ltd.

We regret to hear of the death on July 27 of **Mr. F. C. Guildford,** aged 57, chairman of the Sloan Electrical Co., Ltd.

Rural Electrification

—*Tackling the Problem in Ireland*

THIS week brings the annual reports of both the Electricity Board for Northern Ireland and the Eire Electricity Supply Board, in each of which attention is drawn to the question of rural electrification and, in particular, the economic factors involved.

The annual report and accounts of the Electricity Board for Northern Ireland for 1949 shows that 217,480,000 units were sold by the Board last year, compared with 179,830,000 in 1948—an increase of 20·9%, the average price obtained p.u. being 1·54d. A further 9,520 consumers were connected during the year, of which 5,295 were in rural areas, there being 2,931 farms supplied at the end of the year—an increase of 628 in the 12 months. Under the 1948 Act, the Board must undertake rural electrification development, and the Government's attention has already been called to the fact that such future supplies will produce a relatively small return. This position is appreciated, and with the provision of the expenditure of £900,000 on such work up to the end of 1951, the matter will be later reviewed.

On the generation side, further extensions were carried out at Ballylumford station, where No. 4 turbo-alternator and associated boilers are scheduled for commissioning during the winter of 1950-51, when the station's capacity will be 124·5 MW. This station generated over 331 million units in 1949, the maximum load being 88,542 kW, and load factor based on units generated, 42·61%. During the year under review, the Board took over the operation of the Larne power station, but as the plant here, apart from the three 40 klb/hr boilers, is well beyond its economic life, the station was only used during the winter months. This autumn should see the 110kV Ballylumford to Ballymena line in service, while work is also well advanced on similar lines from Ballymena to Drumnakelly and Drumnakelly to Omagh. In all 159¼ miles of e.h.t. line and 123¾ miles of l.t. mains and distributors were added during 1949.

Eire

Emphasis is also on rural electrification in Eire, it would seem from the annual report of the Eire Electricity Board for the year ended March 31 last. Units sold increased by nearly 57 millions to over 626 millions during that period, the average price received being 1·83d. p.u. Of that total 13,669,000 units were sold in rural areas providing a revenue of £198,600, of which £107,300 was in fixed charges. At the end of March last, the sum of £2,266,000 had been invested in local distribution networks under the Rural Electrification Scheme. Obviously, many of these rural connections are uneconomic, and experience to date confirms the Board's view, earlier expressed, that a subsidy of one-half of the capital will not be sufficient to make rural electrification self-supporting.

In the year under review, service to a further 45 areas was completed, involving the erection of nearly 50,000 poles, and providing 13,688 more consumers. Results of the efforts to stimulate the increased use of electricity are encouraging, for in seven areas where supply has been available for two years the average consumption has increased from 500 units in the first year to 700 units in the second year.

The period covered by the report was also noteworthy in that three new generating stations were put into commission—the 12,500 kW oil-fired station at North Wall, Dublin, the 4,000 kW hydro station at Leixlip on the Liffey, and the turf-fired station at Portarlington. The latter station has one 12,500 steam turbo-generating set, and it is hoped that a second similar unit will be in service during the winter of 1950-51. The combined output of these three stations is approximately 100 million units per annum, and with this assistance, together with the new 10,000 kW Cliff hydro-electric station which should be in operation this month, it is expected that the peak load, this coming winter, will be handled successfully.

UNITS SOLD BY EIRE ELECTRICITY BOARD

	1950 000's	1949 000's	Year's increase %
Domestic	246.23	222.12	10.9
Lighting	47.46	44.38	6.9
Heating, Cooking & Water Heating	72.07	61.81	16.6
Power	227.67	205.68	10.7
Public Lighting ...	17.96	15.71	14.3
Traction	1.64	7.24	77.3
Miscellaneous ...	13.10	12.27	6.7
Total	626.17	569.25	10

In view of the continued and rapid increase in demand, it was decided to construct two further stations, one at Cork, having an initial capacity of 30 MW, and the other a turf-fired station of 40 MW capacity, at Ferbane. A total of 781·8 million units were generated by the Supply Board's stations during 1949-50, a further 1,804,000 being purchased in bulk from the Electricity Board for Northern Ireland.

Three major 110 kV transmission lines, totalling 120 miles, were completed and work on the 124 miles of similar line from Ballyshannon to Dublin is proceeding satisfactorily.

The BUYER'S *Column*

Claw-type Cable Cleats

THE claw-type cable cleats recently developed by BRITISH INSULATED CALLENDER'S CABLES, LTD., Prescot, Lancs, satisfy the need for a universal assembly which can be easily built-up and modified to suit any arrangement of cables. They are suitable for all types of cable sheathed with lead or aluminium and can be installed in any normal indoor or outdoor situation either singly or in groups. They are equally suitable for mounting on walls or steel work for both horizontal and vertical runs.

A comprehensive range of cleats, studs (for clamping), and wall bolts is available, each cleat being clearly marked with the range of cable diameters which can be accommodated. The different stud, bolt and cleat sizes have been carefully selected to give maximum interchangeability and flexibility of erection, and full use can be made, therefore, of a minimum stock of spare parts.

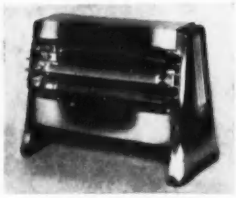
All cleats consist of two identical halves, die-cast in a magnesium-free silicon-aluminium alloy conforming to B.S. 702:1936 and chosen for its strength, light weight and good resistance to corrosion. For cables up to 2 in. diameter, a single-bolt fixing is used, while a two-bolt fixing is employed for larger sizes. The design of an assembly is such that the cleat cannot rotate on the backstrap when the fixing bolt is tightened, and the two halves are dowelled together to ensure their correct alignment and the proper clamping of the cable. Studs and wall bolts are of spun-galvanised steel, their finish being such to eliminate "rusted-up" threads and to prevent direct contact between the mild steel and aluminium.

Getting a grip on things

A FAMOUS statesman is quoted as saying, "Give us the tools and we will finish the job." Having studied details of the tools made by WILKINSON TOOLS LTD. of Kerfoot Street, Warrington, Lancs, we feel that he erred even more than politicians normally do because he did not specify "Wilkinsons." These are first-class tools which go a long way towards making all jobs first-class finished goods. They have behind them a half-century of experience and are made by skilled men, from the best materials known to us today. Pride of place must go to the new range of insulated pliers now available. Insulation unbreakable, resilient and non-inflammable is used, it is tested to withstand 10,000 V. For insulating the pliers, price per dozen pairs varies from 13s. per dozen for the 4 in. size to 21s. for the 8 in. sizes. The company's latest leaflet gives details of prices and designs of the actual tools.

The "Raven" by Creda

THE latest addition to the extensive range of fires made by the SIMPLEX ELECTRIC CO., LTD. of Oldbury, Birmingham, is the Creda "Raven" fire, which we illustrate below.



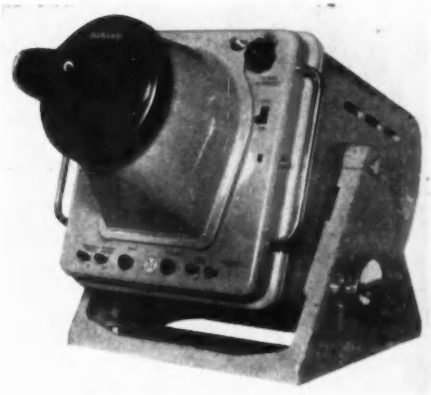
The Simplex Raven fire

This has been especially produced to meet the demand for inexpensive one kW portable fires. It embodies most of the well-known Creda features—attractive design and finish and sturdy construction. The 1 kW element is of the "Solex" pattern. It is constructed from pressed sheet steel and is finished in sprayed shaded silver with chromium-plated reflector. Price is 45s. plus P. Tax 33s. 1d.

40 mile range with "Radiolocator IV"

NEW marine radar equipment, the "Radiolocator IV" has now been introduced by the MARCONI INTERNATIONAL MARINE COMMUNICATION CO. LTD., Chelmsford, Essex.

The new equipment is capable of detecting land masses and other similar targets at distances as great as 40 miles, a new achievement in commercial marine radar.



The Radiolocator IV by Marconi

More compact than previous models, the "Radiolocator IV" is, however, no "baby" model. It has all the advantages of earlier models, i.e., range rings, variable range markers, bearing indicators, clutter and sensitivity controls and open centre device for close range observation.

The main display unit, in a compact light alloy cabinet has a trunnion mounting, although arrangement can be made for a pedestal fitting if desired. Operating controls are all on the face of the panel so that the hand falls naturally on them. A detachable visor is provided to overcome difficulties found in reading scales in bright sunshine or in a brilliantly lighted charthouse.

A single switch starts and stops the unit, the set being in full operation within one minute of switching on. A gyro-compass repeater can be coupled for "North-up" presentation of the display and two remote display units can be fitted without alteration to existing circuits.

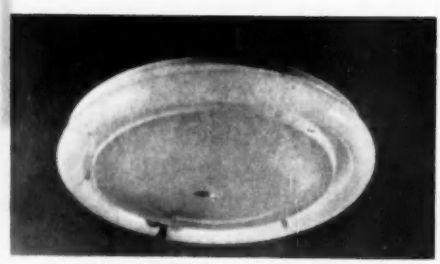
Automatic change of pulse length is another feature of the unit, two pulse lengths being used. These permit greater definition and brighter illumination of targets on the different scales.

The aerial scanner is fitted with a built-in performance indicator which ensures that all radiolocator sets are provided with a standard check on performance and is fitted with de-icing equipment.

New fittings by Scemco

TWO new fittings have been added to the Scemco range—they are the "Stockist" and the "1951."

The first is unusual in that when dismantled it fits compactly into a box 2 ft. by 6 in. by 6 in., making it a handy line to stock and to transport. Designed for a 4 ft 40 W fitting it is an all-purpose industrial unit and is finished in stove enamelled white. List price is £4 2s. complete with tube, there is P. Tax on the tube.

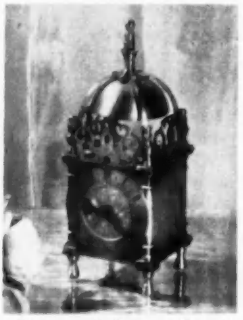


The "1951" fitting by Scemco

The "1951" standard circular industrial fitting has the control gear concealed in the central control box. The 80 W circular lamp is fitted by clips; the whole fitting is stove enamelled white. Price is £7 12s. 6d. with P. Tax on tube only. Further details from SCEMCO LTD., Soho Street, London W.1.

Tradition abreast of the times

AN interesting introduction by SMITHS ENGLISH CLOCKS LTD., of Cricklewood Works, London N.W.2, is this copy of a Cromwellian lantern clock. These clocks were first made in the early 17th century and are noted for their design and the polished brass finish. Smith's new models are available with "Sectric" self-starting movements or eight-day clockwork lever movements. Illustrated is the "Nell Gwynn Bijou" model at £4 11s. 6d. (Sectric) or £5 15s. 6d. (lever movement). These prices are retail.



The "Nell Gwynn Bijou" clock

Prices Increase

NEWS from the MIDLAND ELECTRIC MANUFACTURING CO., LTD., Reddings Lane, Tyseley, Birmingham 11, has reached our offices that prices of the company's products have been increased 10% as from August 1. Raw material and labour costs have increased—these alone are responsible for the present increase.

Readers will remember that M.E.M. were amongst the first to reduce prices after the war and their policy is to reverse the present trend as soon as possible.

THE HOTPOINT ELECTRIC APPLIANCE CO., LTD. have for the same reason found it necessary to increase the cost of their electric cleaner to £12. This is also with effect from August 1. Purchase tax on this appliance remains at £3.

TRADE PUBLICATIONS

ACID RESISTING METALS. Nickel, nickel-copper and nickel-chromium alloys are discussed in relation to their acid resisting properties in a new 71-page book recently issued by Henry Wiggin and Co. Ltd., Wiggin Street, Birmingham 16. Corrosion tests and industrial applications are described at length.

ASBESTOS. Examples from the wide range of uses made of asbestos within the electrical industry are described in a new illustrated booklet which has been issued by Turner Bros. Asbestos Co. Ltd., Rochdale, with the title *Asbestos Textiles and the Electrical Industry*.

CABLES, ACCESSORIES AND APPLIANCES. Details of the latest lines available from Northern Industries, Ltd., Snow Hill, Manchester 4, are contained in a new leaflet.

COMPONENTS. A folder issued by the Plessey Co. Ltd., Ilford, Essex, summarises the production capacity available to manufacturers using small radio and electrical components.

NEW D.C. ARC WELDING RECTIFIER

Completely static equipment, with stepless control of welding current

ALTHOUGH alternating current is extensively used for arc welding, direct current has notable advantages for many types of work. D.C. can also be used very satisfactorily for almost any arc-welding process, and therefore provides a greater flexibility of application and is particularly useful in general engineering shops requiring to handle a wide variety of welding work.

Typical applications where d.c. is preferable are the arc welding of stainless steel (particularly in light gauge plates), carbon and low alloy high tensile steel, cast and malleable iron, non-ferrous metals such as bronze, copper, brass, wrought and cast aluminium and aluminium alloys, nickel and Monel metal.

In the past, d.c. arc welding has necessitated the use of a motor generator (or engine driven generator) with its attendant disadvantages of higher maintenance due to brush, commutator and bearing wear, and greater complication in starting and control.

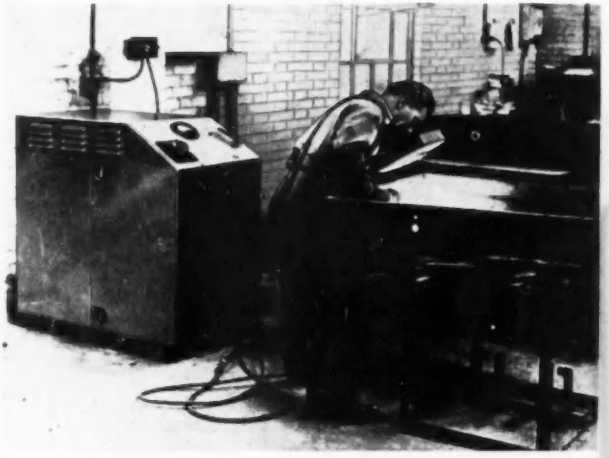


Fig. 1. The new Hackbridge and Hewittic welding rectifier in use

In the new Hewittic welding rectifier, the advantages of a.c. welding equipment are retained, since it is completely static, with no continuously rotating parts.

Stepless Control

The basic circuit is shown in Fig. 2. A six-arm mercury arc rectifier bulb of the grid control type is so connected that three of the anodes (1, 3, 5) are fed directly from the secondary of an air-cooled transformer and the other three anodes (2, 4, 6) through additional reactances X_1, X_2, X_3. Only the grids associated with the former three anodes are utilised for grid control, these three grids being connected to a simple phase shifting device R.

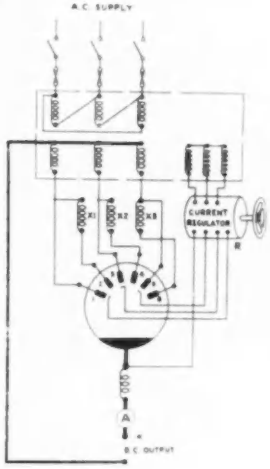


Fig. 2. Elementary diagram of connections of 6 arm grid-controlled rectifier for welding supply

By turning the handwheel of this device, the instant of "firing" of anodes 1, 3 and 5, in each cycle of applied anode voltage, may be advanced or retarded, so smoothly varying the average current carried by anode arms 1, 3 and 5. As the "firing" of the anodes is retarded, these arms will carry progressively less, and arms 2, 4 and 6 progressively more of the total rectifier output and conversely, as the "firing" of the anodes is advanced.

The reactance of the transformer, the secondary of which is connected directly to anodes 1, 3 and 5, is so designed as to provide

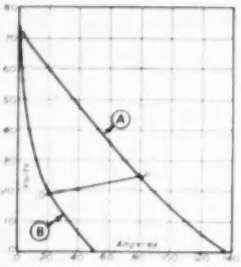


Fig. 3. Current and voltage characteristics of welding equipment

the characteristic "A" in Fig. 3; and the combined reactance of the transformer and additional reactances X_1, X_2, X_3, in circuit with anodes 2, 4 and 6, the characteristic "B" in Fig. 3. Merely by moving the single handwheel of the phase shifter, therefore, completely smooth variation of welding current may be obtained, with an infinite variety of settings between the pre-set characteristics "A" and "B."

For normal welding voltages, a typical range of current adjustment is shown by the operating line OP in Fig. 3, i.e. from 20 amps at 19 V to 80 amps at 25 V, between which limits any setting is instantly available by one-hand control.

As will be seen from Fig. 3, the open circuit voltage of the rectifier is constant at approximately 80 V. The regulation curves have a slope ideally suited to arc welding and cut the normal operating line OP at a wide angle, indicating that the incremental regulation remains high at any operating point, so ensuring high stability of arc conditions over the whole working range.

The equipment is so designed that neither pole of the d.c. output is connected to earth. Hence, the polarity of the electrode relative to the work may be made either positive or negative, the changeover being facilitated by a simple link arrangement at the rectifier.

Unlike rotating plant, the Hewittic welding rectifier has no mechanical or magnetic inertia, so that arc current and voltage follow instantaneously any change in arc condition.

SELLING TECHNOLOGY

BRITISH prestige in engineering was enormously enhanced by the successful work of Sir Frank Whittle on the gas turbine for aircraft jet propulsion. The company he set up has now been reorganised as a Government-owned concern, under the title "Power Jets (Research and Development) Ltd," and is seeking to keep international appreciation of British work in the gas turbine field at the maximum level. In this it is not by any means confining itself to aircraft engines, pointed out Mr. W. E. P. Johnson, A.F.C., the managing director, when he addressed a small gathering of technical press representatives last week.

The main object of Power Jets is to own and manage the patents relating to gas turbines which have been obtained as a result of publicly financed research work. If a proper financial reward is to be obtained from the enterprise resulting in these patents, "technology" must be sold abroad, and such selling must be vigorous. In the absence of a "trade association" in the field there might be the danger of an opportunity being allowed to go by default, but the whole energy of the company is directed towards preventing this happening.

Two main lines of attack on the problem are taken by the team which Mr. Johnson leads. In the first case, Power Jets act as technical consultants, taking the opportunity presented to show Britain's achievement in the general development of gas turbines. Backing up this work is the organisation and staffing of a School of Gas Turbine Technology. Dealing with intensive courses of from one to three weeks, the school offers amongst other studies a three weeks industrial gas turbine course for British post-graduate students and a similar three-week series of lectures and practical work is available for overseas students. This second venture pays particularly good dividends in terms of interest in British developments and respect for British skill.

The Prospect

Summing up the outlook of those responsible for Power Jets, it may be said that they consider that there is little chance that Great Britain will be able to supply most of the world's demands for gas turbines, since even small countries for reasons of security and national pride will want to build their own. What is possible, however, and what it is the object of Power Jets to bring about, is that these same foreign countries shall look to Great Britain for the technological information, based on research and development work, which is necessary to them and probably beyond their means to acquire directly.

THE WEEK
INDUSTRY *in news* COMMERCE

New Lighting Association

THE formation of a new trade association of manufacturers of electric lighting and allied equipment, is announced by Mr. A. Stanley Shier, director of Thorn Electrical Industries Ltd., who was elected chairman of an acting committee at an informal meeting last month. With the title of "The National Association of Manufacturers of Electric Lighting and Allied Equipment," it will include firms dealing with all types of lighting equipment, auxiliaries and control gear. Among the founder-members are: Berry's Electric Ltd., Dernier and Hamlyn Ltd., Ekco-Ensign Electric Ltd., Hailwood and Ackroyd Ltd., Herman Smith Ltd., Frederick Thomas Ltd. and Thorn Electrical Industries Ltd. Its policy will embody the principles of the Fair Trading Code whilst avoiding exclusivity agreements. A further meeting is to be held on September 26.

Food in Flying-boats

TWO of Aquila Airways' "Hythe" flying boats have been equipped with G.E.C. air circulation ovens to provide for hot meals en route from Madeira. Duration of journey to Southampton is nine and a half hours so the hungry passengers will be provided with breakfast and lunch.

These air circulation ovens are for heating pre-cooked frozen food taken aboard at Madeira. Each oven contains nine trays comprising 72 portions. Air, heated by the ten thermo-controlled sheathed wire elements, total rating 2 kW, is circulated around the ovens by a built in fan, consuming 170 W. With this type of oven 24 two-course meals can be served in 45 minutes.

Electricals Retain Young Trophy

FOR the third year running the London Students' Section of the I.E.E. has won the Young Trophy, competed for annually by the London Junior Sections of the three senior engineering Institutions. With victories at cricket, soccer, rifle shooting and table tennis, and the second place at lawn tennis, the Electricals had 74 trophy points out of a maximum possible 80. At a dance held after the final day's events, Mr. Arthur H. Young (Troughton and Young Ltd.), son of the founder of the competition, presented the cup to Mr. I. J. Shelley, chairman of the I.E.E. London Students' Section. Mr. Young recalled his father's interest in student activities, and stressed the importance of the words engraved on the trophy—In sport competing, in work uniting—as applied to members of the three Institutions.

Diesels Supply Yorkshire Show

THE Yorkshire Agricultural Society's Annual Show, held this year at Malton, again enjoyed great success. Not an inconsiderable factor in this success was the efficient supply system which provided adequate power for all the exhibitors.

The site of the showground was in such a position relative to the existing supply mains that the Society decided on a separate source of supply. Eight McLaren MR4 diesel engines coupled direct to 55 kW Brush alternators were installed in the temporary generating station. Total load connected was 530 kW; of this 240 kW was for catering, but the maximum average load in any half-hour period was 480 kW; well within overload rating of the generators.

Dale Electric (Yorkshire) Ltd. designed and erected the overhead distribution network which totalled over two miles of 4-wire mains. The showyard occupied a site on the edge of a limestone ridge. In consideration of the poor soil cover and consequent high resistivity, it was decided to adopt multiple earthing for the neutral of the system. The effect was to give a connection to the general earth mass of sufficiently low resistance to afford protection within the limits of the switchgear fuse ratings.

Brook Motors' all out for Dollars

MANY important factors which influence sales to dollar countries came to light when Messrs. Frank V. and John L. Brook, joint managing directors of Brook Motors', went to the States and to Canada on a market research trip recently.

The First Half-Century

Although they received a further whittling down in the House of Lords, four of the electric power Bills have survived, and in a few days will become law. The Durham, Lancashire, South Wales and North Metropolitan schemes are the forerunners of many another, and their passing is the biggest development in the electric supply industry that has taken place in this country. The respective promoters are to be congratulated upon the pluck and persistence with which they fought an uphill fight.—*From our issue of August 2, 1900.*

Point one is that although the demand for motors is considerable, New World users want something like the streamlined highly finished goods of their own country. They appreciate the quality of our motors, but think the design "old fashioned."

Secondly they know the importance of advertising and will not buy unadvertised goods, regardless of quality.

In the third case, in spite of import tariffs, the price position is definitely favourable to the U.K., but there is, perhaps, naturally enough, a marked hostility by the manufacturers to the import of electrical goods.

Brooks' have not let the grass grow under their feet. To overcome these problems they have developed and put into production a range of motors similar in appearance and performance and mechanically interchangeable with American and Canadian types. An extensive selling organisation has been set up in both countries, resulting, the firm hopes, in a dollar export turnover in a few years, of a million pounds sterling per year.

Co-operation in the West Country

TANGIBLE evidence of the co-operation between the electrical contracting industry and the Area Boards is the joint exhibit at Taunton Industries Fair which opens for a week on Saturday. This is being prepared by the Taunton Electrical Development Group which comprises members of the S.W. Board's local staff and neighbouring contractors.

Many similar organisations have been started following talks between the Board and E.C.A. members last November in Bristol.

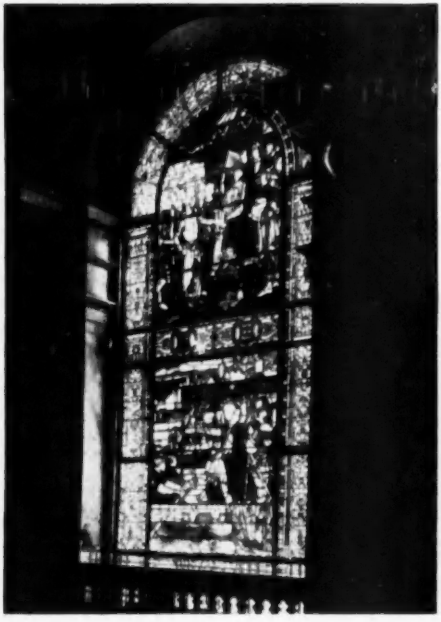
The exhibit is being planned as a joint effort. It will be manned on a rota basis by the staffs of the Board and of the contractors. Inquiries received from visitors who are already clients of contractors will be passed on to the contractors, whilst all others will be pooled and apportioned on an agreed basis.

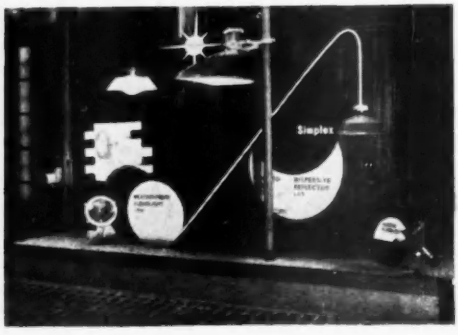
Throwing Light on the City's History

WITH the work of rehabilitation well in hand at London's Mansion House, the Corporation of the City of London decided that they would floodlight externally, the two stained-glass windows in the famous Egyptian Hall, so that their glories might be properly seen when the interior was fully illuminated.

These windows, 30 ft by 13 ft at each end of the Hall, are fine specimens of stained glass portraying scenes from the City's history—the signing of the Magna Carta, the assassination of Wat Tyler at Smithfield, Edward VI on his way to his Coronation and the State Barge of Queen Elizabeth in procession from the City to Westminster.

Lighting the windows presented a difficult problem because only 3 ft offset was possible. However, Messrs. Girdlestone and Co., the contractors working under the supervision of Mr. George Holliday, F.R.I.C.S., the city surveyor, and Mr. H. W. Archer, A.M.I.E.E., managed to surmount the difficulties involved by installing at the base of each window, five G.E.C. Olympia floodlights with "Osram" 1,000-W Class B1 projector lamps and, half-way up the sides in cornices, four G.E.C. pattern F.5742 floodlights with 500-W B2 lamps. Spill shields are fitted and the result is particularly even lighting which brings out the best in these windows at all the evening functions held in this centre of London.





Left: This window in the London Mansion House Egyptian Hall shows the signing of the Magna Carta and Queen Elizabeth in procession in her State Barge from the City to Westminster

Below: Simplex Electric's window in Tottenham Court Road tells of more recent events in the history of illumination design

Batti-Wallahs and Minelaying

MAJOR-GENERAL L. B. NICHOLLS (managing director of Cable and Wireless) and Mr. R. R. B. Brown (deputy chairman Southern Board) were amongst the principal guests at the monthly lunch of the Batti-Wallahs Society on Wednesday of last week, to hear Captain J. S. Cowie, C.B.E., R.N., speak on "Mines and Minelaying in Enemy Waters."

Naval mining had been important since the American War of Independence, said Captain Cowie, but the non-contact mine had only really come into its own during the last war, and he went on to list a few of the methods, acoustic, magnetic, hydrostatic pressure, etc., which could be used. The object of a mine designer was to provide a mechanism which operated with one of the phenomena associated with the passing of a ship but which was not responsive to artificially produced effects used in minesweeping.

Mentioning a few of the additional devices, such as "clickers" to necessitate multiple sweeping, delay-arming clocks and the like which could be introduced, he pointed out the confusion which could be introduced into minesweeping programmes by the judicious laying of mixed bags, and the methods evolved by the Admiralty to ensure delivery within about four days of mines specially "tailored" to suit a particular operation.

Concerning results, Captain Cowie pointed out that some 70,000 mines sown during the war had resulted in the sinking of at least 1,000 enemy ships, in addition to a larger number of vessels damaged and the tying up of 1,000 ships and 50,000 men on minesweeping. The secondary effects in delay and diversion of traffic were almost incalculable. Our success had been due to imagination and team work, and the Admiralty knew that in any future emergency they would again receive the whole-hearted co-operation of manufacturers in the rapid production of the delicate mechanisms required.

Regarding criticisms which had been expressed on policy, Captain Cowie pointed out that it was not possible to plan for the future without an appreciation of the lessons learned from the past. Like last month's speaker (Sir Henry Self) he would conclude with a quotation from the Chinese: "Success lies in the perception of great truths, not in the slavish imitation of unimportant details."

Still Time for Festival Exhibits

ANXIOUS that none of the outstanding products of British industry shall be overlooked, the Council of Industrial Design is calling on every manufacturer to submit details of his "prize" products.

Although selection of exhibits is now under way and although they cannot *guarantee* that submissions which have been received after August 1 will be considered for exhibition, the Council is anxious to receive details right up to the last minute.

They call for whole plate photographs to accompany details of products so that these may be added to the 1951 stock list as a pictorial card index of potential exhibits. This entire stock list will be on show at the South Bank Exhibition during the Festival. Selected photographs will be displayed by film projection, and the whole of the record will be available for inspection. Thus every British manufacturer whose products reach a sufficiently high standard is able to claim representation at the Festival Exhibition even though his goods may not be displayed as actual exhibits.

Local electrical contractors had their own stand at the Tunbridge Wells and South Eastern Counties Agricultural Show, held recently. The stand was manned by the contractors' staffs and the names of all member firms were prominently shown in conjunction with a display of appliances and machinery. We understand that the display was successful in securing many valuable enquiries

More Power to Speed Building

FOLLOWING the publication of the Report of the Working Party on the Building Industry and the Anglo-American Productivity Team, the Minister of Works has discussed with the National Consultative Council what steps should be taken to give effect to the recommendations.

Action has now been initiated on many of these points. Proposals by the electrical contracting industry about the future form of registration in the trade are at the moment under discussion with the M.o.W. Following on the recommendations of the Working Party on the increased use of mechanical aids by builders, the Ministry is negotiating with the B.E.A. with a view to making electric power more easily available on building sites. They are continuing to urge the extended use

of mechanical aids by publicity and arranged a successful plant demonstration in June at Warwick which resulted in large orders for plant. A further event will occur in September as a part of Leeds Building Week.

Overseas Visitors at B.E.A.M.A.

MEMBERS of B.E.A.M.A.'s Export Panel entertained many overseas visitors at their July meeting-lunch and benefited from their advice. Among guests present were Sir Cecil Weir, chairman of "DEB", Mr. W. P. Dobson, director of research of the Hydro Electric Commission of Ontario, Mr. E. L. Merrigan, Commissioner of the Snowy Mountain's Hydro-Electric Authority, who gave a picture of the part which the scheme would play in Australia's supply industry and Mr. A. H. Harvey, the secretary of the B.E.A.M.A.-China Overseas Committee, who has returned recently from China. Also present were Mr. A. L. Fielding, advisory and inspecting engineer to the New South Wales Government and Mr. J. Dudley Smith a member of the B.E.A.M.A.-Argentina Overseas Committee.

Questions in Parliament

Hearing Aids

On a motion of adjournment, Mr. F. Harris raised the matter of hearing aids, and pointed out that in this country there were at least 10 reputable firms which specialised in making hearing aids, and yet contracts for "Medresco" manufacture or assembly had been given by the Government only to the radio industry. With the "Medresco" Mark 2 models there were many cord breakages, requiring complete dismantling of the aids. In the Mark 3 model the cords were attached to a plug for easy maintenance—an arrangement the hearing aid industry had used for years. He alleged that the industry was not consulted on research work, and asked what justification there was for putting research work in the hands of Post Office engineers. He urged the production of a range of aids to cater for all needs. Mr. Blenkinsop, Parliamentary Secretary to the Ministry of Health, explained that the decision was early taken to produce separate aids, and the Electro-Acoustics Committee of the Medical Research Council drew up a specification which is complied with in the instrument now available. Today there were more than 80 technicians distributing hearing aids in some 47 centres, to whom patients are referred after being tested in 137 diagnostic centres. So far more than 80,000 aids have been provided. On the production side, current contracts are with three firms well known in the manufacture of electrical equipment. Arrangements were being made for the production of a limited number of pilot sets of the bone conduction type for testing purposes.

Consumers' Advice Centre

It was suggested by Miss Burton that the Government should set up a consumers' advice centre, independently or publicly financed, to carry out expert tests of consumer goods, and issue buying guides indicating the relative merits and demerits of the various products. The Parliamentary Secretary to the Board of Trade, Mr. Rhodes, thought the idea a sound one. The American scheme seemed only to cover goods worth only 10% of normal consumer expenditure; their best advice was on things like washing machines and refrigerators, about which the layman knew very little. We could use the American technique in a selective and economical way, applying it to those lines where it seems most effective. It was impossible to go into detail at this stage. Mr. Shepherd considered the proposal utter nonsense. The only one way of safeguarding the consumer was to ensure adequate competition.

Capital Expenditure Cuts

Mr. Thorneycroft asked the Minister of Fuel and Power when he expected to complete the consultations he was having with the Electricity Boards on the subject of the cuts in capital expenditure. Mr. Noel Baker replied that the responsibility for co-ordinating the programme of the Area Boards rested with the B.E.A. His responsibility in regard to the electricity investment programme was a general one; he was in continuous consultation with the B.E.A. and he now awaited the authority's conclusions resulting from their consultations with the Area Boards.

New Towns (District Heating)

When Mr. G. Cooper asked the Minister of Town and Country Planning on what grounds it had been decided that district heating schemes should not be proceeded with in the new towns, Mr. Dalton replied that in the one new town where this was contemplated he was satisfied that t would not pay. Mr. Cooper then asked if consideration had been given by the New Towns Development Corporation to the use of heat from rubbish destructor plants as well as from power stations. Mr. Dalton answered that he went into the particular case very carefully, and was satisfied that the density of building was not such as to give any probability of the scheme covering its cost. It was possible, however, that such a scheme in an area of higher density might be economical.

Cases in Court

B.E.A. Sued for Libel

SETTLEMENT in the action for libel of Mekie v. the B.E.A. and Another was announced in the High Court last week. It was stated by counsel for the plaintiff that Mr. E. O. Mekie had held a prominent position with Edmundsons Electricity Corporation, including the directorships of certain subsidiary companies. After the war, with the permission of his managing director, Mr. Mekie became a prospective candidate for Parliament. Subsequent to nationalisation, however, he was informed that senior officials of the B.E.A. must not engage in active politics, and was required to give up his intention to contest a Parliamentary seat. Instead, Mr. Mekie left the B.E.A. in August, 1948, and stated subsequently on several occasions that the reason he had had to leave the B.E.A. was so that he might have freedom to engage in political life.

A member of the constituency for which Mr. Mekie was a candidate wrote to the B.E.A. for confirmation of the reason for Mr. Mekie's leaving, and, said counsel for the plaintiff, a letter was sent by the B.E.A. in what are now agreed to be unfortunate terms, and this letter was produced at an election meeting to refute Mr. Mekie's own statements on this point. Counsel reiterated that the reason, and only reason, that Mr. Mekie left the B.E.A. was for freedom to continue his political associations.

This statement was confirmed by counsel for the defence, who apologised to Mr. Mekie on behalf of the defendants and said that there was no unfavourable imputation of any kind on Mr. Mekie's character.

At the conclusion of the statements, the Judge made an order for the payment to the plaintiff of money paid into court and for taxed costs.

Right to Use of Water

IN the King's Bench Division last week, judgment was given for the British Electricity Authority and Croydon Corporation in the action brought by New Merton Board Mills Ltd. and John S. Deed and Son Ltd., who sought a declaration that they were entitled to the uninterrupted use of a water supply from the River Wandle at Morden. (A report of the hearing was given in our July 6 issue, p. 35.)

Giving judgment, Mr. Justice Lloyd-Jacob said the plaintiffs sought to restrain the diversion of effluent from Beddington sewage works, belonging to Croydon Corporation, and a declaration that, as riparian owners, they were entitled to the natural flow of the River Wandle augmented by the effluent. The artificial water course was constructed entirely for the purpose of getting rid of the effluent from the sewage works. That was a temporary purpose in the sense that it was limited to the period in which the Corporation required to maintain the sewage works at Beddington. In effect it amounted to the riparian owners being given permission to use what the Corporation did not want, so long as the Corporation wanted to continue it. As he understood it, a permissive user could not be the foundation for the presumption of a grant. As during the whole period the plaintiffs were aware of the particular purpose which the discharge was serving, they could not now rely upon the alleged erroneous assumption of their own, that this purpose would continue for ever. Nor could they use it as a ground for avoiding the precarious nature of their enjoyment of the consequences of it.

Dealing with the statutory obligations of the River Wandle Act, Mr. Justice Lloyd-Jacob stated that the preamble of the Act gave a clear indication that what was expedient to be protected was the natural flow of the river. It would be strange, he said, to read the enacting provisions as inclusive of the disposition of sewage effluent. He accordingly held the view that there was no statutory prohibition to prevent the Corporation from dealing with the outflow from Beddington sewage farm in the manner proposed.

Accident While Travelling

A CLAIM for Industrial Injury benefit under the National Insurance (Industrial Injuries Act, 1946) by a member of the Association of Supervising Electrical Engineers, employed as a test and survey electrical engineer, who met with an accident whilst trying to board a train at Greenwich station to go to his employer's Hendon office, has been upheld by the Commissioner following an appeal by the insurance officer. On the Friday before the accident occurred the engineer had gone direct from his home at Greenwich to Liverpool to carry out certain duties there, staying overnight. (His contract stipulated that during test visits his hours of work had to be arranged to suit the job.) Meantime he was instructed to proceed to a job at Bournemouth on the Monday, but first to call at the firm's offices. The original claim was turned down by the insurance officer on the grounds that the accident did not occur in the course of employment. The A.S.E.E. contested that decision at the Local Appeal Tribunal, securing a majority verdict, and the insurance officer then appealed to the Commissioner. The Association submitted that the man's employment had commenced from the moment he left his home at Greenwich, and was performing such work when the accident happened, because he was obeying the orders of his employers and observing the route which he had been directed to traverse. Dismissing the insurance officer's appeal, the Commissioner said, in his view, the claimant on ordinary office days did not begin work until he set foot in his office, but on those days on which he was directed

to proceed to some place outside London, and to do so from his home, without first reporting at the office, clearly the course of his employment commenced at the moment he got off his own doorstep. He saw no distinction when his call at the firm's office was necessitated by his inability to receive instructions the day before, so that he was ordered to go to Bournemouth by way of Hendon. In the particular circumstances, he held that the accident, whereby the man had been incapacitated, arose out of and in course of his employment.

Boy Injured in Substation

LORD STRACHAN gave judgment in the Court of Session last week, finding for the defendant in the action in which G. B. C. Macleod, of Tong, by Stornoway, on behalf of his son, Murdo, claimed £10,000 from the Lord Advocate as representing the Minister of Civil Aviation, in respect of injuries sustained by the youth. In August, 1947, along with a companion, the boy, then about ten years of age, went into an electricity substation belonging to the Ministry at Tong. While they were playing, Murdo's hands came into contact with a bare cable carrying 3,300 V, and it was stated that as a result his right hand was permanently mutilated and his left hand severely mutilated. The substation is situated a short distance from a sandy bay to which people from the neighbouring townships went to bathe, and the pursuer alleged that no steps were taken to exclude the public from the site of the substation.

Lord Strachan held that the pursuer had failed to prove that his son was a licensee in the substation. The pursuer's boy, he said, had been inside only once before the accident. There was no evidence that the Minister of Civil Aviation or his servants had any knowledge of men or boys going inside the station—much less that they ever permitted or tolerated such actings. The case must therefore be disposed of on the footing that the boy was a trespasser.

Lord Strachan said that as far as the evidence showed the Minister of Civil Aviation took no safety precautions whatever when the h.v. current was switched on. That failure, however, did not amount to the degree of recklessness which was necessary for liability to a trespasser. Knowledge of the presence of the trespasser was, he considered, a condition precedent to liability.

Electric Supply News

Canterbury

At the recent meeting of the City General Purpose Committee it was reported that the South Eastern Electricity Board had given notice that the concession of discount for prompt payment of electricity accounts was to be discontinued.

Douglas (I.o.M.)

Total units sold, including bulk supply, during the year to March 31 last, was 29,674,263, as compared with 27,759,679 in the preceding year. Of this, the bulk supply to the Isle of Man Electricity Board amounted to 15,698,815—a load which the undertaking has since lost. There were 7,797 consumers connected at the end of the financial year—an increase of 377—providing an average revenue of £17 4s. 6d. for the year. A further 652 domestic appliances were hired out, bringing the total to 4,539. Work on extending the Pulrose generating station has been considerably delayed, following the decision of the Isle of Man Board to build its own station, but the erection of the building steelwork and boilers is proceeding. The station consumed 37,965 tons of fuel, consumption p.u. generated was 2·46 lb, and working cost p.u. sent out 1·144d. The first large area change-over, involving 499 consumers, was completed, and the progress of the change-over plan is to be speeded-up.

Eastern Board

Records of the results of the first quarter's working of the current financial year of the Eastern Electricity Board, given below, show a satisfactory degree of development. The figures relate to the whole of the Board's area.

	April 1 *to June* 30, 1949	*April* 1 *to June* 30, 1950
Units purchased (millions)	856·480	957·554
Consumers connected ...	11,114	12,840
H.V. mains extended (miles)	125·6	111·1
L.V. mains ,, ,,	116·1	141·0
Total value of contracting work, sales of fittings, appliances, etc.	£790,548	£1,019,382
Cookers sold	7,672	8,396
Water heaters sold ...	1,494	2,368

Power Station Extensions

The B.E.A. has now received the consent of the Minister of Fuel and Power to the development of three new power stations to their full capacity. The stations are Carrington, near Manchester, Braehead, near Glasgow, and Doncaster. Consent had already been given for the first stages of work at these stations. At Carrington, there is to be a further two 60 MW turbo-alternators and four 360 klb/hr boilers, which will bring the station, when completed, to 240 MW capacity. There is to be a further 50 MW set and two 300 klb/hr boilers at Braehead, which will have a total installed capacity of 200 MW, while at Doncaster, two more 30 MW sets and four 180 klb/hr boilers will be installed making the capacity of that station 120 MW.

LIGHTING SCHEME

Bedlington.—The U.D.C. has received sanction to borrow £3,000 for street lighting at Seaton Road.

Company Activities

Electrical Switchgear and Associated Manufacturers

Consolidated trading profit of subsidiary for the year to March 31 was £177,036 (*£157,480*), plus investment income and fees £820 (*£630*), making £177,856 (*£158,110*). To depreciation £19,781 (*£12,260*), subsidiary company directors' remuneration and administration charges £14,718 (*£17,037*), stock valuation reserve £15,000 (*same*), interest on loan from Metal Industries £4,257 (*£3,237*), audit fee £191 (*same*), leaving a consolidated profit of £123,909 (*£110,385*). To U.K. tax £76,837 (*£65,000*), less management expenses claim and over-provision £22,730 (*£4,604*), directors' fees £700 (*£600*), leaving balance of £69,102 (*£49,389*). With £67,570 (*£66,678*) brought in there is £136,672 (*£116,067*) available. To preference dividend £3,162 (*same*), ordinary dividend £65,940 net (*£45,335*), leaving profit retained by Electrical Switchgear £20,000 and subsidiary £47,570.

General Electric Co. Ltd.

Consolidated trading profit for the year to March 31 last was £6,021,980 (*£4,996,454*), plus investment income £161,559 (*£140,848*), making £6,183,539 (*£5,137,302*). Depreciation absorbs £932,435 (*£828,117*), remuneration of directors of holding company: as directors £4,031 (*£3,900*), as executives £123,141 (*£120,397*), to pension fund £247,138 (*£225,026*), audit fee £9,750 (*£9,500*), provision for unascertained liabilities £195,897 (*£132,660*), depreciation of investments £6,999 (*£17,000*), interest on loans £192,456 (*£5,103*) leaving a group profit of £4,471,692 (*£3,795,599*), U.K. profits tax £603,739 (*£499,263*), income tax, including estimated deferred liability of £148,278 in respect of initial allowances £1,774,278 (*£1,378,710*), overseas taxation £352,673 (*£395,836*), profit attributable to minority shareholders in subsidiaries, £31,598 (*£27,113*), leaving a consolidated net profit attributable to holding company of £1,709,404 (*£1,494,677*). With £2,031,606 (*£1,744,210*) brought in, £37,375 (*£41,783*) provisions no longer required and £229,664 (*£147,554*) other income, less U.K. taxation £58,299 (*£134,065*), there is £3,949,750 (*£3,294,159*) available. To discount and issue expenses of 3½% unsecured loan stock £110,000 (*nil*), Preference dividends £185,350 (*same*), to general reserve £596,194 (*£53,210*), reserve against future stock depreciation £175,302 (*£613,389*), to reserve for increased cost of plant replacement £140,000 (*£6,511*), proposed Ordinary dividend of 10% and bonus 7½% £404,093 (*same*), leaving £2,338,811 (*£2,031,606*) carried forward. The chairman, Mr. Harry Railing, states that the improved results are due partly to the completion of remunerative contracts taken in previous years, and partly to a higher volume of turnover. There has been a definite falling off in orders for some products, notably those connected with the building industry.

George Kent

Group profit for year ended March 31 last, after providing for taxation, was £186,537 (*£126,615*). Parent company's profit, after providing for taxation, £172,708 (*£119,842*). Provision for estimated U.K. tax for 1950-51 was £133,900. Final dividend 7%, less tax, making 10% for year (*same*).

Nigerian Electricity Supply

For the year to February 28 last, net profit is £118,672 (*£112,782*), after allowing £35,000 for depreciation. Taxation takes £58,884 (*£57,228*). To general reserve £30,000 (*£25,000*), and there is a final dividend of 4%, plus bonus 2% (*both same*), making 10% (*same*).

Oldham and Son, Ltd.

Consolidated trading profit for the 10 months to March 31 last was £231,004 (*£283,450 for full year*), plus investment income £140 (*£233*), and from Oldham and Son, Africa, gross £11,250 (*nil*) making £242,394 (*£283,683*). To managing directors' salaries £12,500 (*£15,000*), other directors' salaries £3,859 (*£4,631*), directors' fees £917 (*£1,000*), depreciation £10,204 (*£9,040*), audit fee £1,765 (*£1,575*), and interest paid £2,988 (*£7,466*), leaving balance of £210,161 (*£244,971*). To formation expenses of subsidiary company £3,340 (*£325*), taxation £108,551 (*£123,564*) Preference dividend £5,729 (*£6,875*), Ordinary interim 15% and final 10% on capital increased by 100% capital bonus £27,500 (*£33,000*), leaving £65,041 (*£81,207*). Add accumulated profits at June 1, 1949, £91,320 (*£80,113*), less capitalised in accordance with resolution passed on October 13, 1949, £58,438 (*nil*), plus proportion of income tax 1950-51 provided in previous period £72,500 (*nil*), deduct transfer to general reserve £75,000 (*£70,000*), leaving £95,423 (*£91,320* carried forward. Mr. J. Oldham, chairman, states that negotiations have been completed with the Indian Government for establishment of a company under the title of Oldham and Son India. Premises and land have been acquired in Madras and manufacturing is expected to commence early in New Year.

Palestine Electric Corporation

There is recommended a dividend of 5% (*same*), tax free, for 1949 on the ordinary and "A" ordinary stock, as increased by the 16⅔% capital bonus issue. Profit for 1949, after all charges, including Israeli taxation £380,000, and placing £1,125,000 to general reserve, is £170,689 (*£97,511*).

Dividends Declared

Telephone Properties Ltd. First and final dividend of 7% (6%). Net profit is £36,612 (*£24,056*).

Ward & Goldstone Ltd. Final dividend of 24%, making 44% on Ordinary capital increased by a 25% share bonus. The previous year dividends totalled 50%. Profit for 1949-50 is £143,166 (*£108,080*) after allowing £152,248 (*£114,923*) for tax.

Commercial Information

CONTRACTS OPEN

HOME

Aug. 4.—Bridgnorth T.C. Supply and fitting of electric lighting and power installations in 53 pre-war council houses. Council's Consulting Engineer, A. J. B. Pashler, Birmingham. Tender form from Borough Surveyor, College House, Bridgnorth. Deposit £2 2s.

Aug. 4.—Sunderland. Electrical installation work for adaptation and extension of Bede Tower, Ryhope Road. Borough Architect, Grange House, Stockton Road, Sunderland. Deposit £2 2s.

Aug. 5.—Scunthorpe T.C. Supply and erection of (*a*) 60 reinforced concrete street lighting columns; (b) 60 enclosed lanterns with 140-W sodium vapour discharge lamps, (*c*) supply laying and jointing of 5,000 yd of underground cables with switchgear. Cyril Cooper, Borough Engineer, Comforts Avenue, Scunthorpe.

Aug. 5.—Swansea T.C. Electrical installation at Cockett Modern Secondary School. Borough Architect, Guildhall, Swansea. Deposit £2.

Aug. 5.—Wayland R.D.C. Installation of electric light in various houses at North Lopham, South Lopham, Garboldisham and Banham. Surveyor, Council Offices, Attleborough.

Aug. 8.—Ennerdale R.D.C. Equipment for 29 electric street lighting points. Engineer and Surveyor, Council Chambers, Cleator. Deposit £1 1s.

Aug. 8.—Northern Ireland Hospitals Authority. Electrical installation in Radiological Department, Royal Belfast Hospital for Sick Children. F. W. Parkinson and Partners, 6 Murray Street, Belfast. Deposit £2 2s.

Aug. 8.—Northern Ireland Housing Trust. Electrical installations in (a) 25 houses at Annsborough, (b) 62 at Ballynahinch, (c) 62 at Crumlin, (d) 196 at Dundonald, (e) 45 at Kilkeel, (f) 80 at Newcastle, and (g) 20 at Randalstown. Offices of the Trust, 12 Hope Street, Belfast. Deposit 10s. for each scheme.

Aug. 8.—Queensbury and Shelf U.D.C. Provision and erection of sodium street lighting equipment including 25 ft reinforced concrete columns. Approximately 100 lighting points. J. F. Hall, Engineer and Surveyor, Council Offices, Queensbury, near Bradford. Deposit £2 2s.

Aug. 10.—Leeds T.C. For six months' electrical engineering work on housing, education and other properties. Director of Works, Sweet Street, Leeds 1.

Aug. 10.—Nuneaton T.C. Supply, erection and wiring of 10 pre-cast reinforced concrete lamp columns on Ramsden Avenue site. Borough Surveyor, Council House, Nuneaton. Deposit £2 2s.

Aug. 12.—Southport T.C. Supply and erection of five sets of electrically driven (automatically operated) axial flow pumps of a total capacity of 31,250 gallons per minute. Borough Engineer, Town Hall, Southport. Deposit £2 2s.

Aug. 14.—Chester - le - Street R.D.C. Electrical installations in 46 houses at Lumley site, 36 at Ouston site and 92 at Barley Mow site. F. Bowman, Architect, Estate Office, Great North Road, Birtley, Co. Durham. Deposit £2 2s.

Aug. 16.—Angus C.C. Street lighting equipment at Edzell and Friockheim, five lamps and columns each, with wiring, etc. County Engineer, County Buildings, Forfar.

Aug. 18.—W. Riding of Yorks C.C. Rewiring at the West Riding Constabulary Headquarters, Back Bond Street, Wakefield. County Architect, County Hall, Wakefield.

Aug. 18.—Belfast. Two vertical axial flow circulating water channel pumps to pump 24,000 g.p.m. at a head of approx. 13 ft; also crane and channel pumphouse equipment for Harbour power station. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1 Deposit £5 5s. (See our July 13 issue.)

Aug. 19.—Jarrow T.C. Electrical installations in 84 flats. H. W. T. Perkins, Borough Engineer, Town Hall, Jarrow.

Aug. 21.—Denton U.D.C. Provision and erection of 118 h.p. mercury vapour lamps and lanterns, together with bracket arms for attachment to existing trolley bus poles on trunk road A57. Engineer and Surveyor, Town Hall, Denton, near Manchester. Deposit £2 2s. (See this issue.)

Aug. 21.—Ilkley U.D.C. Installation of mercury vapour lighting (42 columns) on trunk road A.65, at Burley in Wharfedale. Surveyor, Town Hall, Ilkley. (See July 27 issue.)

Aug. 21.—St. Albans R.D.C. Provision and erection of 53 reinforced concrete columns, brackets and lanterns with 140-W sodium discharge or 250-W mercury lamps in High St., London Colney. Engineer and Surveyor, 43 Upper Lattimore Rd., St. Albans. Deposit £2 2s. (See July 27 issue.)

Aug. 21.—Bradford T.C. (a) Installation of electric lighting, heating and power, and (b) passenger lift at Waterworks Department, 50/52 Darley Street. City Architect, Town Hall, Bradford.

Aug. 24.—Crompton U.D.C. Supply and erection of 44 reinforced concrete street lighting columns, with lanterns and 140 W sodium vapour discharge lamps in Rochdale Road. Engineer and Surveyor, Town Hall, Shaw.

Aug. 26.—Swinton and Pendlebury T.C. Concrete columns, bracket arms, wiring, lanterns, lamps and auxiliary equipment for lighting 2·08 miles of the Manchester-Chorley (A.6) Road. Borough Engineer and Surveyor, Town Hall, Swinton, Lancs. Deposit £2 2s.

August 28.—Northern Ireland Govt. Electrical installation at "D" Factory, Donegall Road, Belfast. Apply to the Ministry (Room 103), Law Courts Building, May Street, Belfast.

Aug. 30.—Dublin. (*a*) Two (or three) 6-ton electric portal wharf cranes, and (b) two 10-ton electrical portal wharf cranes for Dublin Harbour. Engineer's Office, Dublin Port and Docks

Board, East Wall Road, Dublin. Deposit £5.

Aug. 31.—Bradford. Electrical installation work in extensions and alterations to St. Clare's Junior and Infants' School, Fagley, for the Rev. T. Shanahan. Apply to J. H. Langtry-Langton, Architect and Sur-Surveyor, 8 Oak Mount, Manningham, Bradford, by August 7. Deposit £2 2s.

Sept. 1.—Belfast T.C. 33 kV main cables, auxiliary cables, and accessories for stage 1 of the 33 kV distribution system extensions. Merz and McLellan, consulting engineers, Carliol House, Newcastle-upon-Tyne 1. Deposit £5 5s. (See July 27 issue.)

Sept. 6.—Dublin. New electric lift at St. Bricin's Hospital. J. Tyrrell, secretary, Office of Public Works, Dublin.

Sept. 8.—Bournemouth T.C. Vehicle-actuated traffic signals at Cemetery Junction. Borough Engineer, Town Hall, Bournemouth. Deposit £1 1s.

No date stated.—Gateshead T.C. Electrical installation at Gateshead new technical college. (Names to be submitted by August 3.) H. J. Cook, Chief Architect, Swinburne Street, Gateshead. (See July 27 issue.)

No date stated.—Swansea T.C. Electrical installation at New Cockett modern secondary school. Borough Architect, Guildhall, Swansea. (Applications by August 5). Deposit £2. (See our July 20 issue.)

No date stated.—Stanhope Parish Council. Maintenance of metal filament street lighting lamps. N. Brown, Westville, Wearhead.

No date stated.—Dublin. Electrical installation at Nurses' Home, Leopardstown Park Hospital. Office of Public Works, Dublin. Deposit £1.

No date stated.—E. Preston. Electrical installation at Grange county primary school. Borough Engineer and Surveyor, Municipal Building, Preston.

No date stated.—Swansea T.C. Electrical installation at the new Cockett Modern Secondary School. Apply to Borough Architect, Guildhall, Swansea, by August 5. Deposit £2.

No date stated.—Fife C.C. Electrical work in addition to County Buildings. Apply to J. M. Mitchell, County Clerk, County Buildings, Cupar, Fife, by August 14.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Aug. 10.—Buenos Aires. Electrical equipment and transmission cables for control of sluice gates at "Los Quiroga" dam in the province of Santiago del Estero. Director General of Water and Electric Power, Buenos Aires, Argentina.

Aug. 22.—Buenos Aires. Ten diesel electric generating sets of 25, 50, 75 and 100 kW d.c. Tender No. 263/50. Director General of Water and Electric Power, Buenos Aires, Argentina.

Aug. 24.—Auckland. Supply and installation of electrically-driven pumping plant and pipe specials for Mount Hobson pumping station. Stores Purchasing Officer, Town Hall, Auckland. Deposit £2.

Aug. 29.—Pakistan. Supply of 6 and 12 V batteries, secondary, portable, War Office and suitable commercial types. Commercial Secretary, Supply and Stores Department, 40 Lowndes Square, S.W.1. Reference SD 6869/G.S., fee 5s. Advertised in July 27 issue.

Aug. 30.—Uruguay. Two calibrating stations for a.c. measures, single phase and 3-phase, of 3 and 4 wires normal current 3 x 220 V, with capacity for three measures each; and an automatic current stabilizer. B.o.T. (Ref. CRE (IB) 59549/50.*

Sept. 5.—Australia. Radio beacon equipment and diesel electric generating plant for the Commonwealth Lighthouse Service. The generators needed are: two 90 kVA units, and two of 45 kVA, with two switchboards. B.o.T. (Ref. C.R.E. (IB) 60011/50.*

Sept. 7.—Egypt. Power transformers: twenty 150 kVA, forty 300 kVA and three 400 kVA. Chief Inspecting Engineer, Egyptian Govt., 41 Tothill Street, London, S.W.1. Fee £2 1s. per set.

Sept. 8.—Johannesburg. Supply and delivery of one 50 kVA, 3-phase power transformer, outdoor pole-mounted type, and two 250 kVA, 3-phase power transformers, indoor type, all suitable for 11,000/400/231 V; extension to the electrical network including all material and labour, laying cables and providing switchboards, etc. D. J. K. Marais, Nataid House, 14 Plein Street, Johannesburg.

Your Queries Answered

"Readson" sunray lamps, makers of? T.E.—F. W. Read and Sons Ltd., 175 Grays Inn Road, London, W.C.1. (18503)

"Doughty" towel rails, makers of? E.E.—J. M. Doughty and Sons Ltd., 214 St. John Street, London, E.C.1. (18508)

"Freezemaster" farm deep freezer, agents for? T.E.—Frigicold Ltd., 10 Manchester Square, W.1. (18513)

"Aristocrat" fires, makers of? T.E.—M. P. Stainless Products, Kettlebrook Road, Tamworth, Staffs. (18519)

"Gardy" fuse bridges, agents for? T.E.—Thompson and Co., Kingsbury Works, Kingsbury Road, London, N.W.9. (18524)

"Micalox" switches, makers of? E.S.B.—We presume this engineer refers to the "Micaloc" switch formally made by Berry's Electric Ltd., of Touchbutton House, Newman St., W.1. (18529)

"G G" porcelain, makers of? T.E.—Gaskell and Grocott Ltd., Station Road, Longport, Stoke-on-Trent. (18534)

"R Major" iron, makers of? S.E.—This was made by the Rockman Eng. Co. Ltd. of Manchester, a firm which went out of business about two years ago. (18536)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

Fire guard, louvred type, in anodised aluminium, makers of? N.W. (18540)

Sept. 22.—Brisbane T.C. Various types and lengths of 11 kV and 600 V impregnated p.c. l.c. underground cable and jointing material. B.o.T. (Ref. CRE (IB) 59978/50).*

Sept. 27.—Victoria. 6/6 kV and 22 kV distribution transformers for State Electricity Commission. Agent-general for Victoria, Victoria House, Melbourne Place, London, W.C.2. Deposit £20.

Oct. 6.—Pretoria. One hundred 10 kVA, single-phase, 11,000/250 voltage ratio; ten 15 kVA, treble-phase, 11,000/433; ten 25 kVA, treble-phase, 11,000/433; and ten 50 kVA, treble-phase, 11,000/433 voltage ratio for Stores Department, City Council of Pretoria. Town Clerk, City Hall, Paul Kruger St., Pretoria.

Oct. 12.—Brisbane. Seven 33 kV metal clad outdoor type reactors for City Electric Light Co. Ltd. B.o.T. (Ref. CRE (IB) 59985/50).*

Oct. 17.—Bloemfontein. Two stoke-fired boiler units and other plant for extensions to No. 2 power station. Tender No. L.847. Merz and McLellan, 32 Victoria St., S.W.1.

Oct. 25.—Queensland. One water tube boiler (Specification No. 224). Secretary, State Electricity Commission, Scottish Union House, Eagle St., Brisbane, Australia. B.o.T. (Ref. C.R.E. (IB) 59114/50).*

Oct. 25.—New Zealand. Control and protective equipment for Cobb River power station for State Hydro-Electric Department, comprising one six-panel control board, one six-panel relay board, one two-panel metering board, one two-panel miscellaneous board, loose equipment and spares. Contract No. S.C. 2080.

Nov. 1.—Salisbury. Two water tube boilers, superheater, economiser, air heater, mechanical stoker, draught apparatus, steam and feed piping, foundations, structural steel work, hoppers, gangways, ladders, instruments and accessories, etc., for Umniati "B" generation station. Contract No. 74/1950. Secretary, Electricity Supply Commission of Southern Rhodesia, P.O. Box 377, Salisbury. B.o.T. (Ref. CRE (IB) 59295/50).*

PRICES OF CABLE METALS AND OTHER MATERIALS

(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	186 0 0	£180 0 0
Delivered in 2nd and 3rd month after order	187 10 0	—
Delivered in 4th, 5th and 6th month after order	189 0 0	—
LEAD, good soft pig (foreign)	96 0 0	96 0 0
" "English" quality	97 10 0	—
Delivered in 2nd and 3rd month after order, plus	1 0 0	—
TIN (99-99.75%) (Cash)	730-731	—
" (3 months)	729-730	—
ALUMINIUM, commercial purity (del.)	112 0 0	—
ZINC	127 10 0	120 0 0
ARMOURING		
Galv. Steel Wire (0.104 in.)	43 5 0	—
Mild Steel Tape (0.04 in.)	26 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

L. Bunce (Electrical) Ltd. Meeting of creditors at Dudley Arms Hotel, Market Place, Dudley, on August 9 at 3 p.m.

Riley and Peirson (Electrical), Ltd. Resolution for voluntary winding-up passed at meeting on July 19. Mr. R. B. Smith, York House, 3 Alfred Street, Leeds 1, appointed liquidator.

Swaning Electrical Co. Ltd. Meeting of creditors and contributories at Room 401, Inveresk House, 346 Strand, W.C.2, on August 9 at 2.30 p.m. and 3 p.m. respectively.

Volta Electric Ltd. Creditors to send claims to T. W. Lloyd, Liquidator, Arcade Chambers, Victoria Road, Aldershot, by August 31.

Partnerships Dissolved

Hounslow. Arthur John Hyams and Sydney Joseph Darg, trading as Albion Electrical Construction Co., at 24 Avondale Gardens, Hounslow. Dissolved as from June 30, 1950.

London. Harold James Bone and Sidney Thomas Harris, trading as S. T. Harris and Co., 4 Creechurch Lane, London E.C.3. Dissolved as from May 31. All debts dealt with by H. J. Bone who is carrying on the business.

BANKRUPTCY ACTS

First Meeting

Bury St. Edmunds. Louis Walter Aldis, electrical engineering contractor, of Greengates, Top Street, Rattlesden, and previously at Lyndhurst Cottage, Woolpit. First meeting held on August 1. Public examination at The Guildhall, Bury St. Edmunds on September 22 at 11 a.m.

Receiving Order

Boston. Ingall, Frederick Dennis, lately trading as Ruskington Radioelectrics, at High Street, Ruskington. Receiving order dated July 24, 1950.

CONTRACTS PLACED

British Electricity Authority.—During the past month contracts have been placed for power station work, plant and equipment amounting in the aggregate to £2,296,981. The principal contracts include: Acton Lane "B" power station: foundations, Sir Robert McAlpine and Sons Ltd.; and reinforced concrete cooling tower, J. L. Keir and Co. (London) Ltd.; York power station: demolition and reconstruction, Sir Robert McAlpine and Sons (Newcastle-upon-Tyne) Ltd.; Uskmouth power station: superstructure, John Morgan (Builders) Ltd.

Victoria. Distribution transformers for State Electricity Commission. Partridge, Wilson and Co. £53,500.

TRADE NOTES

Change of Address.—As from August 7, the address of the office and works of the Sturdy Electric Co. Ltd., will be Sturdy Works, Burnopfield, Newcastle-upon-Tyne, telephone, Burnopfield 237.

Holidays.—The Luton works of the Jackson Electric Stove Co. is closed from July 28 to August 8.

New Factory.—A. B. Metal Products Ltd., have opened their new factory at Ynysboeth, Abercynon, Glamorgan.

New Offices.—Pyrotenax Ltd., have opened offices at Parsonage Chambers, 3 The Parsonage, Manchester (telephone: Blackfriars 6946), under the management of Mr. R. B. Barritt.

BUSINESS PROSPECTS

HOME

Bath T.C. Erection of 42 dwellings at Freeview Road, Tiverton. City Engineer, Guildhall.

Beckenham T.C. Erection of 80 houses at Oak Lodge Estate, West Wickham. J. Dove, Borough Engineer, Town Hall, Beckenham, Kent.

Bexhill T.C. Erection of 16 bungalows at Preston Road, Sidley, also 12 houses at Ninfield Road. A. E. Geldard, Borough Engineer and Surveyor, Town Hall.

Billingham-on-Tees. Extensions are proposed to engineering shops and foundry for the Furness Shipbuilding Co., Ltd., Haverton Hill-on-Tees.

Birmingham T.C. Erection of 50 houses and maisonettes at Sedghill Avenue, Hillyfields Estate, Harborne. H. J. Manzoni, City Engineer and Surveyor, Civic Centre, Birmingham.

Blackpool T.C. Erection of a special school at Bispham Road, Carleton. A. Hamilton, Borough Surveyor, Municipal Building, Blackpool.

Bootle T.C. Erection of 62 dwellings at Captain's Lane site, near Ford station. Borough Surveyor, Town Hall.

Bournemouth T.C. Erection of a junior school for 280 pupils at Kinson estate. Borough Architect, Room 98, Town Hall.

Cannock R.D.C. Erection of 10 houses at Broadholes Lane, Wheaton Aston. Engineer and Surveyor.

Cardiff R.D.C. Erection of 192 dwellings at Eglwys Wen site, Whitchurch. S.P. Youldon, Engineer, Surveyor and Architect, 20 Park Place, Cardiff.

Dudley T.C. Adaptation of "Newlands," St. James's Road, as a children's home. P. D. Wadsworth, Town Clerk.

Durham. G. H. Gray, Camden Street, North Shields, is architect for additions covering 22,000 sq. ft. to a factory on the Draonville Estate for North-Eastern Trading Estates, Ltd., North Shields, on behalf of Durham Industries, Ltd.

Hebburn-on-Tyne. Jarrow and Hebburn Co-op. Society, Albert Road, Jarrow, are to carry out alterations to their premises in Lyon Street to plans by the C.W.S. Architects' Dept., 90 Westmorland Road, Newcastle-on-Tyne.

Islington T.C. Inviting applications from firms to be placed on list from whom the Council will invite tenders for electrical installation and repair work at street lighting installations, etc., from time to time. H. D. Clark, Town Clerk, Town Hall, Upper Street, N.1.

Lincolnshire C.C. Erection of technical college buildings at Kingsway, Scunthorpe, consisting of boiler house, canteen, engineering and building block. A. R. Clark, County Architect, County Offices, Lincoln.

Middlewich. The U.D.C. is to invite tenders for installation of electricity in 58 houses at St. Ann's Avenue, Kitfield Avenue and Hayhurst Avenue.

Midhurst R.D.C. Erection of 18 dwellings at Easebourne site. T. Greenfield, County Architect, "Newstead," Midhurst.

Monmouthshire C.C. Additional classrooms at Glyn-Coed infants' school, Ebbw Vale. C. L. Jones, County Architect, Queen's Hill, Newport, Mon.

Newcastle-on-Tyne. The E.C. has approved plans for the proposed Ravenswood Road County Primary School. Architect is G. H. Gray, Camden Street, North Shields. The quantity surveyor is J. W. Summers, 61 Westgate Road, Newcastle-on-Tyne. No contracts have yet been placed.

Newton Aycliffe (Co. Durham). Tenders are being obtained by the Aycliffe Development Corporation for the erection of 90 houses on Clarence Farm West. Architects are Grenfell Baines Group, Simpasture, Newton Aycliffe.

North Kesteven R.D.C. Erection of 18 houses and 2 bungalows at Skellingthorpe. J. Chadwick, surveyor, 31 Clasketgate, Lincoln.

Onchan (I.o.M.). Erection of 30 houses off School Road, for Village Commissioners. J. P. Lomas, architect, Martin's Bank Chambers, Victoria Street, Douglas, I.o.M.

Osgoldcross R.D.C. Erection of 38 houses at Byram Park, Brotherton. J. W. Bland, Clerk, Tanshelf House, 15 Front Street, Pontefract.

Poole. Erection of 24 houses for Southern Division, B.E.A. Apply to P. D. A. Oliver, divisional secretary, B.E.A., High Street, Portsmouth.

Rhymney U.D.C. Erection of 40 dwellings at Ty-Coch site. W. T. Jones, Council Offices.

Southgate T.C. Erection of 36 flats and six houses at Bramley Road/Reservoir Road site. Borough Engineer and Surveyor, Town Hall, Palmers Green, N.13.

South Shields. A revised scheme has been approved for the erection of three-storeyed flats in Prince Edward Road South, comprising 24 three-bedroomed flats and 48 two-bedroomed. Tenders are to be obtained for the erection of 30 houses at Harton Downhill. Contracts are to be let shortly by the T.C. for the erection of 76 terrace houses at Simonside. Plans by J. Reid, Borough Engineer.

Widnes T.C. Erection of 118 dwellings at Crow Wood estate. T. A. Brittain, Borough Architect, Brendan House, Widnes Road, Widnes.

OVERSEAS

Australia. Page Manufacturing Company, Rosa Street, Catley, Sydney, is interested in engineering equipment and also is seeking technical information on air compressors, paint spray plant and centrifugal sand blasting.

Belgium. S.P.R.L. Rene Katte, 25a Marche au Lait, Antwerp, seeks quotations and agency for electric refrigerators, vacuum cleaners and radio sets.

Belgian Congo. Africongo (La Nouvelle Compagnie Africaine du Congo), Leopoldville, is interested in receiving offers of sole representation in the Congo for electrical equipment (not radios or domestic electrical appliances).

Canada. Utility Distributing Company, 4660 Decarie Boulevard, Montreal, is interested in importing into Canada electrical appliances, refrigerators, electric wiring devices, and toys.

Egypt. International Engineering Union (consulting engineers and contractors), 27 Soliman Pasha Street, Cairo, want electrical machinery, including motors and control gear up to 150 h.p. (including f.h.p.); generators above 200 kVA; power transformers and switchgear.

Nicaragua. Gonzalos and Levy Cia Ltda., Apartado Postal 277 Managua, want purchase quotations from manufacturers of refrigerators, freezing units, radios, typewriters and cash registers.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Barron Electrical Co., Ltd., 9 The Avenue, W. Ealing, W.13. To take over business carried on as "Barron Electrical Co." at Greenford, Mdx. Cap.: £1,000. Dirs.: S. W. H. Mugford and S. S. G. Mugford, 33 Jubilee Rd., Greenford, Mdx.

Daytime Manufacturing Co., Ltd., 18 Evelyn Av., Ruislip, Mdx. Mechanical, electrical, radio and general engineers, etc. Cap.: £1,000. Dirs.: J. S. Kosak, 18 Evelyn Av., Ruislip, Mdx.; F. T. Lerwill, 47 Ruislip Court, West End Rd., Ruislip, Mdx.

Dunn and Dyer (Electrical), Ltd., Merriotts Place, Newport, Mon. Electrical engineers and contractors, etc. Cap.: £100.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Diacooler. 688,820. Class 11. Cooling machines and installations. C. G. Hibbert and Co., Ltd., 6 Duke St., London S.W.1.

Flamguard. 667,681. Class 11. Electric fires and guards. F. Turnbull, Lotus Works, Heigham Rd., London E.6.

Hotpoint. 687,762. Class 14. Clocks. Hotpoint Electric Appliance Co., Ltd., Crown House, Aldwych, W.C.2.

Hyralarm. B675,495. Class 9. Burglar alarms. Camburn Alarm Systems, 11 Bothwell St., Glasgow C.2.

Otter. 684,747. Class 9. Electric switches. Otter Controls, Ltd., Queen's Building, St. Peters Sq., Stockport, Cheshire.

MEETINGS TO NOTE

MONDAY, AUGUST 28

SUBMARINE CABLE CENTENARY.—Exhibition opens at Science Museum, South Kensington, London.

WEDNESDAY, AUGUST 30

BRIT. ASSN.—Annual meeting, Birmingham.

TUESDAY, SEPT. 5

SCIENTIFIC INSTRUMENT MANUFACTURERS' ASSN.—Annual exhibition and symposium (until Sept. 8). Examination Hall, Queen Square, W.C.1.

WEDNESDAY, SEPT. 6

RADIO INDUSTRY COUNCIL.—Radio and television exhibition (until Sept. 16). Castle Bromwich, Birmingham.

MONDAY, SEPT. 18

INTER. MECH. ENGRG. CONGRESS.—(Until Sept. 23). Brussels.

ASSN. PUBLIC LIGHTING ENGRS.—Annual meeting and conference (until Sept. 23). Winter Gardens, Bournemouth.

KALGOORLIE ELECTRIC POWER

Second Highest Output

THE forty-fourth annual general meeting of Kalgoorlie Electric Power and Lighting Corporation, Ltd., was held on July 26 at the offices, 1 Broad Street Place, London E.C.2.

MR. A. J. FIPPARD, M.I.E.E., chairman of the company, presided and in the course of his speech said: The accounts before you are largely self-explanatory, but it is my pleasure to refer you to the more salient features shown therein. The balance of Australian revenue at £28,116 is £3,467 less than that for the previous year despite the fact that 53,245,923 units were sold (some 810,000 units more than in 1948), which is the second highest output ever recorded during the history of this undertaking. The fall in net Australian revenue is mainly accounted for by increased maintenance costs and higher fuel consumption per unit during the months of September and October, when, for part of that period, the 7,500 kW set was taken off load for overhaul and re-blading.

The net profit for the year, after charging London office expenses, was £24,550 and after adding the balance brought forward from 1948 and providing for normal taxation, there remains £26,435. United Kingdom taxation relief in respect of initial allowances on £15,291 of new plant purchased during the year leaves a total sum of £31,650 available, of which £6,000 has been transferred to depreciation reserve (making the total depreciation reserve £260,000), £2,119 to general reserve (making a total on this account of £50,000) and £7,000 to capital reserve. This latter reserve has now been invested and will in due course be utilised towards the redemption of the debenture stock issued in January last. The Board recommends a dividend of 7 per cent., which is the same as for last year and which will absorb £7,219, leaving a balance of £9,312 to be carried forward.

As the fixed assets appeared in the balance-sheet as at December 31, 1948, at £113,706, and were valued on August 2, 1949, at £468,150, the board have decided that the addition of £6,000 to depreciation reserve (as against £10,000 provided last year) is adequate.

Changes and Extensions

With regard to changes and extensions to the generating station, the June monthly report from Kalgoorlie shows satisfactory progress and indicates that building foundations are well advanced, foundations for two new boilers, including ash pits, etc., have been completed, while shuttering for the third boiler was nearing completion; that construction of 52 ft of the ash tunnel was completed, that a considerable amount of the boiler plant, together with economisers, has been delivered, including headers for all the 12 new boilers, and that erection of the steel structure and drums of the first two boilers has been commenced.

Devaluation of Sterling

Our gold mining consumers who, between them, take about 95 per cent. of the units sold by your corporation have materially benefited from the devaluation of sterling which was announced in September, 1949.

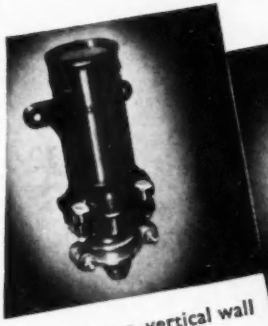
The increased profits of the mines have, of course, brought the inevitable demands from labour which, since devaluation, have resulted in an increase in basic wages for mine workers of over 40s. Australian per week. Although the rate of pay for our own labour was not directly affected by the mine workers wage ordinances, it has been necessary for us to increase our wage rates in order to maintain our labour force.

Changes in Directorate

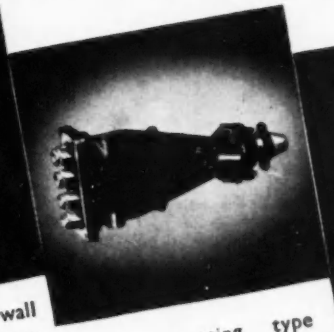
As mentioned in the directors' report, changes have taken place in the directorate and Mr. W. F. Talbot, F.C.I.S., and Mr. D. S. Warren, were elected to fill vacancies. Mr. D. E. Webb, F.C.A., was appointed as an additional director.

Again it is my pleasure to commend to you the untiring efforts of the staff, both in Australia and this country.

The report and accounts were adopted.



Circular type, vertical wall mounting, for single core cable.



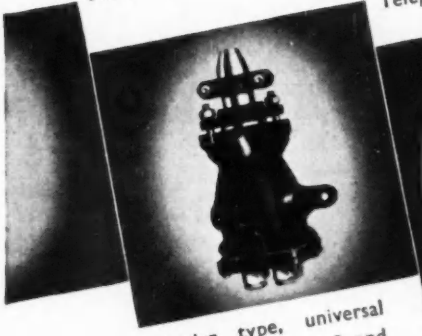
Flange mounting type (horizontal or inverted) for twin, 3 and 4-core cables.

Flat type, universal wall mounting, for twin, 3 and 4-core cables.

Flat type, vertical wall mounting for twin, 3 and 4-core cables.

Circular type, vertical wall mounting, for 3 and 4-core cables, and Signal, Pilot or Telephone Cables.

Flange mounting type (vertical) for twin, 3 and 4-core cables.



Circular type, universal wall mounting, for 3 and 4-core cables.

There's a HENLEY Indoor Terminal Box to suit every normal requirement, for working pressures up to 660 V. Please write for Catalogue 35.

HENLEY

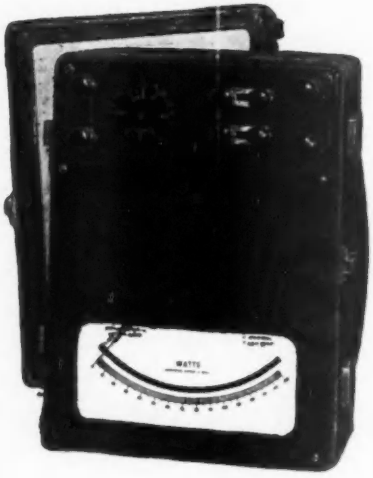
TERMINAL BOXES

W. T. Henley's Telegraph Works Co. Ltd., 51 53 Hatton Garden, London, E.C.1.

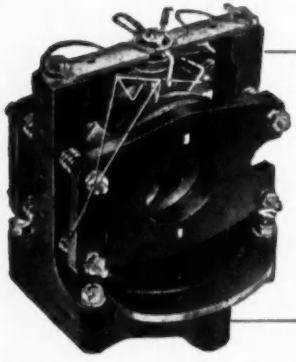
FEATURES OF WESTON SUPERIORITY

Weston

DYNAMOMETER SUB-STANDARD INSTRUMENTS



This latest development of the well-known 'Weston' sub-standard Wattmeter is made in three models, each of high-grade dynamometer type, designed for a wide range of precision measurements. The standard series is particularly suitable for meter standardisation and for use as a transfer standard between A.C. and D.C. circuits. Type 2 is recommended for low power factor circuits and Type 3 for higher power frequencies. Similar in size and design, each is housed in a lightweight Bakelite case, with easy reading 6″ scale, knife-edge pointer and anti-parallax mirror. The moving element is fitted with spring-loaded jewels, double magnetic shielding is employed and each instrument carries a certificate of individual performance and guarantee of accuracy to 0.25%. Ample voltage and current ranges are available by simple switching which can be safely applied when the instrument is on load. Model S67 (as illustrated). Size 11″ × 9½″ × 6⅛″. Weight 10 lbs. (approx.)



EXTREME RIGIDITY. An unique feature of these 'Weston' models is the self-contained assembly independent of the casing, thus ensuring extreme rigidity. The whole instrument is housed as one complete unit in an attractive Bakelite case with leather carrying strap and detachable cover. Ample shielding and the absence of metal parts eliminate errors due to external magnetic fields and eddy currents.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX.

Telephone: Enfield 3434 & 1242 - - - Telegrams: Sanwest, Enfield.

DEPOTS AT: GLASGOW, NEWCASTLE-ON-TYNE, LEEDS, MANCHESTER, WOLVERHAMPTON, BRISTOL, LIVERPOOL, NOTTINGHAM, SOUTHAMPTON, IPSWICH AND BRIGHTON.

121

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED • FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

BOROUGH OF SWINTON & PENDLEBURY

TENDERS FOR STREET LIGHTING: MANCHESTER-CHORLEY (A.6) ROAD

TENDERS are invited for the following works:

CONTRACT 1—the provision and erection of concrete columns, bracket arms and wiring, and

CONTRACT 2—the provision of lanterns, lamps and auxiliary equipment,

for the above road, 2.08 miles long.

Plans and general conditions of contract may be inspected at, and specifications, bills of quantities, forms of tender obtained on the deposit of £2 2s., from the office of Borough Engineer and Surveyor, Town Hall, Swinton, Lancs.

Tenders will be considered for either or both contracts, but the Corporation do not bind themselves to accept the lowest or any tender.

Tenders, in sealed envelopes provided for the purpose and bearing no indication of the name of the tenderer, must be returned to Vincent Collinge, Esq., Town Clerk, Town Hall, Swinton, Lancs., to reach him not later than the first post Saturday, August 26, 1950.

VINCENT COLLINGE,
Town Clerk.

Town Hall,
Swinton, Lancs.
August 1950. (F 545)

URBAN DISTRICT COUNCIL OF DENTON

TRUNK ROAD A.57
PROPOSED ELECTRIC LIGHTING SCHEME

TENDERS are invited for the provision and erection of 118 high pressure mercury vapour lamps and lanterns together with bracket arms for attachment to existing trolley bus traction poles on the above road.

Plans and general conditions may be inspected and Form of Tender obtained at the office of the Engineer and Surveyor, Town Hall, Denton, near Manchester (Tel. Denton 2638/9) between the hours of 10 a.m. and 4 p.m. (Saturdays excepted) on deposit of two guineas (£2 2s.) (cheque only), crossed and made payable to the Urban District Council of Denton, which will be refunded on receipt of documents, together with a bona fide tender. Tenders to be delivered to the undersigned not later than 10 a.m. on Monday, August 21, 1950.

No tender will be accepted unless in a plain sealed envelope bearing the words "Tender for Trunk Road Lighting," but not bearing any name or mark indicating the sender.

The Council do not bind themselves to accept the lowest or any tender and reserve the right to accept separate tenders for the supply and erection of bracket arms and the supply and erection of the lanterns and equipment.

JAMES SMITH,
Clerk of the Council.

Town Hall, Denton, nr. Manchester. (F 527)

APPOINTMENTS VACANT

RECTIFIER ENGINEERS are required by the English Electric Company, Stafford. These vacancies are for qualified engineers for employment in the Design, Test, or Commercial Departments, and applicants with experience of Mercury Arc Rectifiers should write giving full details quoting reference 439 to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street, London S.W.1. (F 378)

NORTH WESTERN ELECTRICITY BOARD

No. 2 Sub-Area

APPOINTMENT OF TESTING ASSISTANTS

APPLICATIONS are invited for the appointment of Testing Assistants at the No. 2 Sub-Area Testing Station, Walkden.

Applicants should have had some experience in at least one of the following branches:

1. Calibration, repair, maintenance and testing of all types of Polyphase metering equipments.
2. Installation and maintenance of power metering equipments on site.
3. Testing of protective relays on site and laboratory testing of protective gear.
4. Experience in the use of high-voltage testing equipment for "on site" tests of cable, switch-gear and other types of equipment.

Candidates should hold the Higher National Certificate in Electrical Engineering or its equivalent, and should have had a thorough practical training in the above work.

The provisional salary will be within the range £400-£550 per annum, according to qualifications and experience.

The post is superannuable.

Applications, stating age, experience, qualifications, present post and salary, should be received by the Manager, The North-Western Electricity Board No. 2 Sub-Area, National Buildings, St. Mary's Parsonage, Manchester 3, not later than Saturday, August 12, 1950. (F 549)

BRITISH ELECTRICITY AUTHORITY

South Western Division

SHIFT CHARGE ENGINEER—PORTISHEAD GENERATING STATION

APPLICATIONS are invited for the position of Shift Charge Engineer at Portishead Generating Station. Salary and conditions in accordance with the N.J.B. Schedule, Class "J," Grade 7, £736-£770 per annum.

Applicants should have good technical experience, a sound knowledge of the operation and maintenance of generating plant and preference will be given to applicants possessing the Higher National Certificate or equivalent qualification.

The appointment will be superannuable under the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, qualifications, experience, present appointment and salary, should be addressed to the Divisional Secretary, British Electricity Authority, South Western Division, 26 Oakfield Road, Bristol 8, so as to be received not later than Monday, August 14, 1950.

R. C. BARRETT,
Divisional Secretary.

July 20, 1950. (F 469)

LONDON ELECTRICITY BOARD

VACANCIES : DRAUGHTSMEN

APPLICATIONS are invited for Draughtsmen in the South-Eastern Sub-Area as follows :—

(a) TWO ENGINEERING DRAUGHTSMEN

Applicants should be not less than 21 years of age, have had a good general education and drawing office experience also experience in the layout of substation switchgear, transformer compounds, etc., and should possess at least the Ordinary National Certificate.

Pending grading under the appropriate national agreement the provisional salary will be £500 per annum inclusive.

(b) TWO MAINS RECORDS DRAUGHTSMEN

Applicants should be not less than 21 years of age, have had a good general education and drawing office experience, preferably on mains records.

The salary for these two posts will be in accordance with the general clerical grade of the permanent agreement of the National Joint Council (Administrative and Clerical Grades).

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, on receipt of an addressed foolscap envelope, to be returned duly completed not later than August 12, 1950. Please quote EST/V/889/T on envelope and all correspondence. (F 518)

SOUTH EASTERN ELECTRICITY BOARD

West Kent District

SENIOR SALES REPRESENTATIVE

Salary of £390 x £450 p.a. plus London Weighting under the N.J.C. Agreement, Grade 2. Superannuation will be arranged. Applicants should be capable of advising consumers on supply matters, tariffs, apparatus and installations. Experience in the application of electricity to farming and horticulture will be an advantage.

Applications, giving two referees, must reach the West Kent Manager, South Eastern Electricity Board, 270 High Street, Orpington, by August 14, 1950.

Croydon District

SENIOR SALES REPRESENTATIVE

Salary of £390 x £20-£450 p.a. plus London Weighting under the N.J.C. Agreement, Grade 2. Superannuation will be arranged. Applicants should be experienced in consumers' service, tariffs and their application, the installation and use of electrical appliances, and the preparation of wiring estimates.

Croydon District

SALES REPRESENTATIVE

Salary of £310 x £20-£390 p.a. plus London Weighting under the N.J.C. Agreement, Grade 1. Superannuation will be arranged. Applicants should be able to prepare wiring estimates and advise consumers on tariffs and the installation and use of electrical appliances.

Applications, for the above positions, giving two referees, must reach the Croydon District Manager, Electric House, Wellesley Road, Croydon, by August 14, 1950.

Mid-Sussex Sub-Area

SURVEYOR

Salary of £705 x £30-£795 p.a. under the N.J.C. Agreement, Grade 7. Superannuation will be arranged. Applicants should be suitably qualified, preferably Corporate Members of the I.C.E. or I.C.S. with experience in surveying land and buildings, building design, and construction and maintenance of buildings. The person appointed will be in charge of the Sub-Area surveying, architectural and building staff.

Applications, giving two referees, must reach H. Pryce-Jones, Esq., M.Eng., M.I.C.E., Mid-Sussex Manager, South Eastern Electricity Board, Electric House, Castle Square, Brighton 1, by August 14, 1950.

A. L. BURNELL,
Secretary.

July, 1950. (F 551)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

APPLICATIONS are invited for the following positions:

COMBINED CROYDON "A" AND "B" POWER STATIONS

(a) MAINTENANCE ENGINEER (Electrical)

Applicants should preferably possess B.Sc. Degree or equivalent qualification, together with extensive experience in the maintenance of E.H.T. switchgear, E.H.T. motors, alternators, low-voltage auxiliaries and power-station instruments; in administration and control of labour.

(b) ASSISTANT CHEMIST

Applicants should be qualified in either B.Sc. or A.R.I.C. They should have experience in fuel testing, water analysis and lubricating oils and should preferably have had experience in modern power-station installations.

KINGSTON "B" POWER STATION

(c) EFFICIENCY ENGINEER

Applicants should preferably hold a University Degree in engineering and be a corporate member of the Institute of Mechanical Engineers or the Institute of Electrical Engineers, and should have had extensive experience in a responsible position of the testing and efficient operation of large high-pressure generating plant.

The salaries will be in accordance with the N.J.B. Schedule, inclusive of London Allowance, as follows:

(a) Class "K," Grade 6, £893 11s. per annum.

(b) Class "K," Grade 9, £721 7s. per annum, and provisional pending a final decision by the National Joint Board.

(c) Class "G," Grade 6, £742 7s. per annum, and provisional pending a final decision by the National Joint Board.

Forms of application may be obtained by sending a stamped addressed foolscap envelope to the Divisional Secretary, British Electricity Authority, South-Eastern Division, Lower Ham Road, Kingston-upon-Thames, Surrey, and should be returned, together with copies of two recent testimonials, not later than August 17, 1950. (F 548)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London, W.C.2

BRITISH ELECTRICITY AUTHORITY

London Division

ASSISTANT ELECTRICAL MAINTENANCE ENGINEER
WOOLWICH GENERATING STATION

APPLICATIONS are invited for the position of Assistant Electrical Maintenance Engineer at Woolwich Generating Station.

Applicants should have served a recognised apprenticeship with a firm of Electrical Engineers manufacturing heavy h.t. electrical equipment, e.g. switchgear, alternators, motors, controls, etc. Some power station or erection work experience would be considered an additional advantage.

Candidates should possess technical qualifications up to Higher National Certificate standard.

Salary is in accordance with the revised N.J.B. Schedule Class "G," Grade 9 (subject to approval by the appropriate negotiating machinery).

The appointment will be superannuable under the terms of the British Electricity Authority and Area Boards' scheme.

Applications, stating age, qualifications and experience should be addressed to the Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, so as to be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.
(F 526)

SINGAPORE MUNICIPALITY

ELECTRICITY DEPARTMENT

CHARGE ENGINEERS. Permanent Staff, required for shift duties in the Singapore Power Station. Present capacity, 37,000 kW, with proposed extensions to 87,000 kW.

Experience of extra high-tension 3-phase generation in a modern high-pressure steam power station is essential. Appointment subject to medical examination.

Basic salary scale, $440-$870 per month. Starting point according to qualifications and experience. Graduated scale of allowances, e.g., present allowance on $560 p.m. basic salary amounts to: Expatriation $110 p.m., plus cost of living, $192 p.m. for single man or $246 p.m. for married man, or $318 p.m. for married man with family. Annual increments, $30 p.m. Local taxation much lower than England. One Straits dollar equals 2s. 4d. Thus a married man with family on basic salary of $560 would draw equivalent of £1,383 sterling per annum.

Quarters, with heavy furniture, provided at 8 per cent. of salary or housing allowance up to 12 per cent. in lieu. Initial engagement on three years' agreement; eight months' leave after four years' service. Free medical attention. Passages paid, including family. Compulsory provident fund contribution, 7½ per cent. of salary, and Municipal Commissioners donate 7½ per cent. for first 10 years, rising to 20 per cent. after 20 years' service.

Applications, in duplicate, with full personal and technical information and copies of three testimonials, to Messrs. Peirce and Williams (agents to the Municipal Commissioners), 1 Victoria Street, London S.W.1. (F 444)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of SWITCHBOARD ATTENDANT in District 106 (Carmarthen) in the Western Sub-Area of the Board.

The station is within the range 10,001-20,000 kW and work is in shifts of a four-week cycle.

The wage will be in accordance with the Agreement of the National Joint Industrial Council for the Electricity Supply Industry and will be at the rate of 3/0 ½ per hour.

Applications, stating age, present position, and full details of experience should be sent to the Sub-Area Manager, South Wales Electricity Board, South Beach Pavilion, Tenby, Pembs., so as to reach him not later than August 12, 1950. (F 520)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

STATION SHIFT CONTROL ENGINEER—AVON

APPLICATIONS are invited from suitably qualified engineers for the position of Station Shift Control Engineer, at Avon Generating Station, Warwick.

Candidates should have practical experience in the operation of generating-station switchboards.

The salary will be in accordance with Class "E," Grade 10, of the National Joint Board Schedule, at a commencing salary of £488 per annum, and the appointment will be superannuable.

Applications should be submitted on the official form of application, which may be obtained from the Divisional Establishments Officer at the undermentioned address, and be returned not later than August 14, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham.
July 18, 1950. (F 463)

NORTH WESTERN ELECTRICITY BOARD

No. 1 Sub-Area

APPOINTMENT OF AN ASSISTANT IN THE SUB-AREA CONSUMERS' ENGINEER'S DEPARTMENT

APPLICATIONS are invited for a position as an Assistant on Domestic and Commercial Development, in the Sub-Area Consumers' Engineer's Department at No. 1 Sub-Area Headquarters, Town Hall, Manchester.

Applicants should have experience in each of the following :—

Supervision of Service Centres
Domestic and Commercial Load Development
Organisation of Exhibitions and Demonstrations
Public Speaking, Advertising and Display
Agricultural and Horticultural Applications

The salary will be in accordance with Grade 4 of the National Joint Council (Administrative and Clerical Grades) for the Electricity Supply Industry Salary Agreement, i.e. £510 by £20 to £570 per annum.

Applications, stating age, education, training, technical qualifications and previous experience, present position and salary, should be received by the Secretary, No. 1 Sub-Area, The North Western Electricity Board, Town Hall, Manchester 2 not later than Saturday, August 12, 1950. (F 591)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPOINTMENT OF ESTABLISHMENTS OFFICER

APPLICATIONS are invited for the position of Establishments Officer, Midlands Division, at a salary within the scale of Principal Assistant, £900 to £1,020 per annum. The post is superannuable under the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Candidates must have had a sound general education, possess good organising ability and have had experience of negotiation and joint consultation work either in the electricity supply industry or in a large industrial concern. The possession of a recognised professional qualification will be considered an advantage.

The scope of the appointment covers the recruitment and engagement of staff and implementation of national agreements affecting salaries, wages and service conditions of Technical, Clerical and Manual employees, together with the associated administrative duties.

Forms of application may be obtained from the Divisional Secretary, 53 Wake Green Road, Moseley, Birmingham 13, and should be returned not later than August 19, 1950.

H. N. WILSON,
Divisional Secretary.
(F 535)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPOINTMENT OF DEVELOPMENT SUPERINTENDENT

APPLICATIONS are invited for the appointment of Development Superintendent, Sub-Area Commercial Staff, at No. 3 Sub-Area Headquarters, Chester, at a provisional salary of £700 per annum, subject to any variation as may be necessary after negotiation with the appropriate staff organisation.

Applicants must be Chartered Electrical Engineers, and have had wide experience in the commercial side of the supply industry, and development of industrial, commercial, rural and domestic supplies, contracting and consumers' service.

The successful candidate may be required to undergo a medical examination, and, if eligible, will be required to contribute to a superannuation scheme.

Applications must be made on a form to be obtained from the Manager, No. 3 Sub-Area, Merseyside and North Wales Electricity Board, Electricity House, Newgate Street, Chester, and should be returned to him in a sealed envelope endorsed "Development Superintendent" so as to be received not later than September 2, 1950.

JAMES RANKIN,
Secretary.
(F 550)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER at the Stuart Street Generating Station, Bradford, Manchester 11.

The salary will be in accordance with Grade 7, Class "H," of the Revised N.J.B. Schedule, i.e. £692-£722 per annum.

Candidates should preferably have had experience in a large modern generating station, including the operation of pulverised fuel-fired boilers.

Corporate membership of the Institution of Electrical or Mechanical Engineers will be an advantage.

Applications, stating age, present position, and giving full details of qualifications, education and experience, should be received by The Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than August 19, 1950. (F 547)

MIDLANDS ELECTRICITY BOARD

Central Gloucester Sub-Area

APPOINTMENT OF FIRST ASSISTANT DISTRICT CONSUMERS' ENGINEER

APPLICATIONS are invited for the above position in the Cheltenham District of the Central Gloucester Sub-Area.

Applicants should have a wide knowledge of the sale and installation of domestic, agricultural and commercial electrical equipment, and be experienced in electrical contracting work and the maintenance of consumers' supplies. The person appointed will be required to prepare specifications and estimates and will be responsible for the supervision of the practical work. Technical qualifications will be considered an advantage.

The appointment will be in accordance with N.J.B. Conditions and the salary will be in Class "D," Grade 6, £594-£616 per annum.

Applications, stating age, qualifications, experience and present salary should be sent within fourteen days to :—Mr. D. Holt, Manager, Central Gloucestershire Sub-Area, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
July 22, 1950. (F 517)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

STOCKTAKER

APPLICATIONS are invited for the position of Stocktaker at this divisional headquarters.

The successful applicant should have first-class knowledge of electrical stores as applied to generating stations and transmission lines, and must be prepared to travel throughout the East Midlands area for the purpose of taking stock at various locations.

The salary will be in accordance with Grade 2 (£390-£450) of the National Joint Council Agreement, and the position will be superannuable.

Applications must be submitted on the appropriate form which can be obtained from the Divisional Establishments Officer, at the undermentioned address, and when completed, should be delivered not later than August 14, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham. (F 504)

NORTH WESTERN ELECTRICITY BOARD

No. 1 Sub-Area

APPOINTMENT OF JUNIOR ASSISTANT INSTALLATION ENGINEER

APPLICATIONS are invited for the appointment of Junior Assistant Installation Engineer in the Sub-Area Consumers' Engineer's Department, No. 1 Sub-Area, Town Hall, Manchester.

Applicants should preferably have had experience in contracting work, particularly in large commercial premises, and in preparing specifications.

Possession of the Higher National Certificate in Electrical Engineering, while not essential, will be considered an advantage.

The salary will be in accordance with the revised National Joint Board Schedule, commencing in Class "M," Grade 20, at £395 per annum, and rising to Class "M," Grade 17, i.e. £465 £473 £481 per annum.

Applications, stating age, qualifications, present position and salary, should be received by the Secretary, No. 1 Sub-Area, The North Western Electricity Board, Town Hall, Manchester 2, not later than Saturday, August 12, 1950. (F 522)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:

JUNIOR ENGINEER—LUTON GENERATING STATION

Salary in accordance with Clause 35 of the revised N.J.B. Schedule. Commencing salary of £375 per annum, Grade 14, Class "E."

Applicants should have reached the standard of Ordinary National Certificate in Electrical Engineering or its equivalent, have had some experience in the operation of a generating station.

The successful applicant will be required to undertake shift duties of a junior nature in the operation of the generating plant and supervise a d.c. switchboard, rotary converting plant.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than August 11, 1950. Envelopes should be endorsed "Junior Engineer, Luton."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (F 546)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

STAFF VACANCY NOTICE
APPOINTMENT OF SENIOR SALES ASSISTANT

APPLICATIONS are invited for the appointment of a Senior Sales Assistant at the Electricity Service Centre, Blaenau Ffestiniog.

The salary payable will be within the range of £390-£450 per annum according to qualifications and experience, and in accordance with Grade 2 of the Salary Agreement of the National Joint Council for the Electricity Supply Industry.

Applicants should have a sound training in Electrical Retail Trade and a wide knowledge of modern electrical appliances for commercial and domestic use. Experience in an Electricity Undertaking, and ability to speak Welsh, would be added qualifications.

The post will be under the supervision of the District Commercial Officer and the duties attached will include the supervision and control of the Showroom and Service Centre, display of apparatus and window dressing, hire-purchase transactions, and receipt of accounts payable at the Service Centre.

The successful candidate may be required to satisfy the Board's Medical Adviser and, if eligible, will be required to contribute to a Superannuation Scheme.

Applications, on forms to be obtained from the Manager, Nos. 4/5 Sub-Areas, Merseyside and North Wales Electricity Board, Electricity House, Rhostyllen, near Wrexham, should be completed and returned to him not later than August 16, 1960.

JAMES RANKIN,
Secretary.
(F 534)

ABERDARE CABLES, LTD., Aberdare, require immediately two experienced ESTIMATORS for handling overseas enquiries for paper insulated cables. State salary required and experience. (F 486)

AREA CONTRACTS ENGINEER. Enfield Cables Limited seek experienced Contracts Engineer, accustomed to organising and supervising industrial and underground electric cable contracts up to highest voltages, and able to take charge of an area in Southern England. Details, in confidence, of age, training, experience and salary required to C. J. Armstrong, M.I.E.E., Enfield Cables Limited, Victoria House, Southampton Row, London W.C.1. (F 520)

ASSISTANT STOREKEEPER required by large firm of Electrical Contractors. Salary in accordance with experience.—Apply, in writing, in first instance, to Barlow & Young, Ltd., 19/21 Palace Street, London S.W.1. (F 528)

BUYER-STOREKEEPER required by well-known London Contractors. Must have had similar stores' experience. Permanent position, ample scope and comparable salary offered to youngish man with energy and intelligence. Details of experience, age and salary required to Box No. 1581, Electrical Times. (F 537)

CABLE SALES ENGINEER required for Midland Area to develop sales of rubber insulated cables. Applicants must have an intimate knowledge of rubber cables and preferably a good connection with commercial, industrial, electricity supply and municipal undertakings. Applications, giving details of experience, age and salary required, should be sent to Mersey Cable Works Limited, Linacre Lane, Bootle, Liverpool 20. (F 543)

DRAUGHTSMAN with experience of large transformer manufacture required by electrical engineering company in North-East London. Permanent position, with superannuation scheme, for suitable applicants. Good salary and working conditions. Write, stating age, experience and salary required, to Box No. 1545, Electrical Times. (F 453)

DRAUGHTSMEN. Senior Draughtsmen required to work in the Manchester district; experience in light mechanisms for relay and small electric equipment, knowledge of power railway equipment an advantage.—Reply, in writing, stating age, training, qualifications and salary required, marking envelopes "Power," to: Box No. 1575, Electrical Times. (F 529)

DRAUGHTSMEN with experience in the fabrication of large steel tanks and vessels required by electrical engineering company in North-East London. Permanent position, with superannuation scheme, for suitable applicants. Good salary and working conditions.—Write, stating age, experience and salary required, to Box No. 1547, Electrical Times. (F 454)

SENIOR DESIGNER, experienced in electrical accessories, wanted immediately. Permanent with excellent prospects. Salary in accordance with experience and qualifications. Staff superannuation. Birmingham District.—Box No. 1579, Electrical Times.
(F 532p)

URGENTLY REQUIRED

POWER STATION CHARGE ENGINEERS

by major oil company for service in the Middle East. Applicants must hold at least Higher National Certificate in Electrical Engineering and have had not less than three years' experience in the operation of large modern Steam Power Stations with thorough knowledge of the routine operation of water-tube boilers, turbo-alternators, E.H.T. switchgear and auxiliary plant. Present position in this country should be not less than Grade 8a, Class "H" or Grade 8, Class "G" on N.J.B. Scale. Age not over 35 years. Married accommodation available. Commencing salary not less than £900 per annum PLUS an allowance in the local currency which is liable to variation but which at the present time is equal to £1,400 per annum. Free passages out and home, free medical attention, kit allowance, good leave arrangements, excellent Pension Scheme. Write giving age, personal particulars and full details of qualifications and experience, quoting Dept. F.189, to

Box No. 2550 at 191 Gresham House, E.C.2

(E 284p)

ELECTRICAL DRAUGHTSMAN required by major oil company for service in the Middle East. Must have served five years electrical engineering apprenticeship, and have had five years D.O. experience in connection with electrical layouts of large industrial plants with underground cable networks. Should possess Higher National Certificate. Graduate or associate membership of a corporate engineering body desirable but not essential. Maximum age limit 35 years. Attractive salary plus generous allowance in local currency. Free passages out and home, free medical attention, kit allowance, good leave arrangements. Pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.192, to Box No. 2809, at 191 Gresham House, Old Broad Street, E.C.2. Applicants without above requirements will not be considered. (F 322)

ELECTRICAL DRAUGHTSMEN for oil refinery work, experienced in wiring and installation layouts and taking off quantities. Should be capable of laying out small sub-stations and switch-houses. Knowledge of cable layouts and flame-proof conduit work desirable. Five-day week with paid overtime.—Apply by letter, stating age, experience, salary expected, and when free to commence work, to Chief Draughtsman, The Lummus Co., Ltd., 525 Oxford Street, London W.1. (F 357)

ELECTRICAL ENGINEER required by old-established Essex electrical engineering firm, experienced in the preparation and execution of industrial electrification installations, preferably with flour mill experience, also conversions from existing to electric drive, including switchgear, alternators, transformers, shafting, drives and motors up to 500 h.p. A thorough knowledge of present-day practice is necessary. Permanent position would be offered to the right man and remuneration would be in accordance with capabilities.—Write, stating age, experience and salary required.—Box No. 1551, Electrical Times. (F 478)

ELECTRICAL ENGINEERS required for service in Middle East. Applicants should (a) possess Ordinary or Higher National Certificate and have had full apprenticeship with heavy electrical equipment manufacturers or with a large colliery or allied fully electrified industry, or (b) possess a degree and have had two years' technical apprenticeship with similar firm to above. In each case applicants must have had at least three years' subsequent experience on the installation and maintenance of heavy electrical equipment. Maximum age limit 35 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.191, to Box No. 2563, at 191 Gresham House, E.C.2. (E 415)

ESTIMATING ENGINEER required by old established electrical contracting firm in W.1 district. All-round experience desirable, able to introduce business an advantage, good prospects for capable man. Reply in own handwriting, giving details of experience and salary required, to Box No. 1583, Electrical Times. (F 538)

EXPERIENCED ELECTRICAL LAYOUT DRAUGHTSMEN required immediately. Knowledge of aircraft electrics preferred but not essential.—Apply, stating age and details, etc., to Staff and Labour Manager, The Bristol Aeroplane Co., Ltd., Aircraft Division, Filton House, Bristol. (F 448)

LARGE industrial undertaking requires ELECTRICAL ENGINEERS for works in Swansea and Liverpool areas. Duties include maintenance of large a.c. and d.c. rolling mill drives and other specialized equipment including furnaces. Candidates should be between 30 and 45 years of age, and have at least Higher National Certificate or A.M.I.E.E. Experience on similar types of plant to the above is essential. Starting salary from £900 £800 per annum, according to qualifications, etc.—Write, full particulars to: Box No. 1571, Electrical Times. (F 519)

MALE CLERK required for London sales office, with experience of engineering equipment.—Apply, giving full particulars, to General Sales Manager, Worthington-Simpson, Ltd., Queen's House, Kingsway, W.C.2. (F 385)

SENIOR DEVELOPMENT DRAUGHTSMAN required for oil circuit breakers and switchgear up to 11 kV and general switchgear development. Salary commensurate with ability. Manchester district.—Full details of experience, technical education and salary required to: Box No. 1559, Electrical Times. (F 508)

SENIOR METHODS ENGINEER required by Mid-Essex manufacturer of house service meters and electrical instruments. Applicants must be familiar with all aspects of manufacture and able to lay down efficient methods and estimated process times.—Apply, giving full details of previous experience, to Box No. 1513, Electrical Times. (F 398)

SHIFT ENGINEER required for Middle East appointment with large Oil Company. Applicants, preferably under 35, should have had regular training in electrical and mechanical engineering with technical qualification of H.N.C. standard. Practical experience should include time spent in modern central generating station, comprising w.t. boilers, turbo alternators, h.t. switchgear. Salary incremental from £600, plus allowances £330-£640 dependent on marital circumstances and free furnished quarters. Pensionable service. Biennial (paid) home leave.—Write, with full informative detail, and quoting No. 13, to Box No. 3592 c/o Charles Barker and Sons, Ltd., 31 Budge Row, London, E.C.4. (F 530)

TECHNICAL REPRESENTATIVE selling commercial lighting fittings and installations in London, required immediately. State age, experience.—Box No. 1557, Electrical Times. (F 503)

TECHNICAL SALES REPRESENTATIVES required for London and Home Counties, with experience of pumping machinery preferred, but not essential.—Apply, giving full particulars, to General Sales Manager, Worthington-Simpson, Ltd., Queen's House, Kingsway, W.C.2. (F 384)

TRANSFORMER DRAUGHTSMEN SENIOR AND JUNIOR required, with experience up to 500 kVA. Please write, stating age, experience and salary required, to Nevelin Electric Co. Ltd., Purley Way, Croydon. (F 468)

TRANSFORMER ESTIMATOR TECHNICAL CORRESPONDENT required. Must be capable of dealing with tenders for home and overseas business and be experienced in that direction. Practical experience an advantage. Applications, stating age, qualifications, experience and salary required should be addressed to the Employment and Welfare Manager, Messrs. Johnson and Phillips, Ltd., Victoria Way, Charlton, S.E.7. (F 487)

VICKERS-ARMSTRONGS, LTD., Weybridge, invite applications for the post of PROJECT ENGINEER to be in charge of certain special projects. Qualifications required for the post include experience of control methods and knowledge of electronics and instruments.—Write stating experience and qualifications, to Employment Manager, Weybridge Works. (F 505)

VICKERS-ARMSTRONGS, LTD., Weybridge, invite applications for the post of ELECTRONIC ENGINEER to take part in electronic side of special projects.—Write, stating experience and qualifications to Employment Manager, Weybridge Works. (F 506)

APPOINTMENTS WANTED

APPLIANCE development. CHIEF ENGINEER (38), with experience of domestic and commercial cooking equipment, water heaters, small appliances, control mechanisms, and general light engineering, seeks new appointment. Many years in charge of technical departments. Good knowledge of production methods, patent procedure, Admiralty, Ministry, B.E.A., and export requirements.—Box No. 1493, Electrical Times. (F 351)

ELECTRICIAN (37), 20 years' experience, desires maintenance post with accommodation. Bungalow for sale to person wishing to retire whose post he could fill.—Box No. 1353, Electrical Times. (F 22)

O.N.C. (ELEC.), exp. D.O., generation, requires post with small engineering firm. Test-bed or work requiring good theoretical knowledge. B'ham, Coventry, Leicester area.—Box No. 1549, Electrical Times. (F 477)

SALES ENGINEER (35), A.M.I.E.E., requires post with scope for initiative. Midland area. Car owner.—Box No. 1541, Electrical Times. (F 441)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines). Service Electric Co., Ltd., Stanmore, Middx. (D 324)

ARMATURE ROTOR AND STATOR WINDING. We specialise in the repair and rewind of all types of electrical machines from fractional h.p. upwards. Special departments for vacuum cleaners, dryers, portable tools, etc. All work fully guaranteed.—Walter Crane, Greencoat Electrical Works, Westgate, Wakefield. Telephone 2172. (A 4)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (F 370)

ZEROS REFRIGERATORS.—Complete range of repair and service now available. Equipment reconditioned to conform to pre-war manufacturers' specifications.—Time Engineers, Refrigeration Specialists, 60 Southend Road, Rainham, Essex. Tel.: Rainham 2358; or Southern Area Agency. Tel.: Springpark 4217. Electrical Spares supplied to the trade. (A 439)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105. (A 20)

SCRAP ACCUMULATOR PLATES and Sediment wanted, any quantities. Also Storage Batteries purchased and dismantled.—Phone or write Elton Levy Co., Ltd., St. Ermin's (West Side), Caxton Street, London S.W. Phone: WHItehall 9621/2/3. (A 3)

WANTED.—D.C. and a.c. ball-bearing MOTORS.—Full details to Britannia Manufacturing Co., Ltd., 22/26 Britannia Walk, London N.1. (A 13)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady St., Bethnal Green E.1. (A 1)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling.—Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED 6/8-ton Loco. Elect. Crane.—Pike Bros., Private Sidings, Colnbrook, Bucks. (F 500)

AGENCIES

AGENTS on commission required by electrical manufacturer of repute, established 16 years. Applicants should have good existing connection with Area Boards, Wholesalers and Retailers. Exclusive territories available in several parts of United Kingdom.—Full details and other lines carried to: Box No. E.T., Hannaford and Goodman, 69 Fleet Street, E.C.4. (F 510)

BUSINESS OPPORTUNITIES

ACTIVE DIRECTOR required to develop Sales Business in well-established contracting company. East coast town. £1,000 investment. Salary and profits.—Box No. 1569, Electrical Times. (F 516)

FOR SALE

By Order of the Minister of Supply

G R

NINTH SALE

M.O.S. STORAGE DEPOT, RUDDINGTON
(5 miles from Nottingham on the main Loughborough-Leicester Road)

WALKER, WALTON AND HANSON

(in association with Turner, Fletcher and Essex and Richardson and Linnell) will Sell by Auction, on Tuesday, and Wednesday, August 22 and 23, 1950, at 10.30 a.m. punctually each day, a large quantity of

MISCELLANEOUS GOVERNMENT EQUIPMENT AND STORES

including: Cranes, Lorries, Pile Drivers, Tyres, Tubes and Wheels (with and without axles), Scrap Batteries and Transformers, Radar Van Bodies, Engines, Electric Hoists, M.T. Spares, Cable, Cases, Drums and Boxes, Soap Containers, Predictors, Pulley Blocks, Bicycles, Tyre Repair Outfits, Cloth, Mattresses, Boots and Shoes, Blankets, Clockwork Mechanisms, Clothing, Desks, Cupboards, Tiles, Slates, Ladders, Handcarts, Barrows, Scaffolding, Battens, Laths, Trestles, Blow Lamps, Small Tools, Paint, Varnish, and Distemper, Diesel Engine Compressors and Ingersoll Compressors mounted on Chevrolet 3-ton Lorries.

On view: Wednesday, August 16; Thursday, August 17; Friday, August 18; Monday, August 21, 1950, 9 a.m. to 4.30 p.m. each day and on Sale Days from 9 a.m. to 10.15 a.m.

Catalogues: Price 6d. (postal orders only), to admit One Person on Sale Days and Two persons on View Days may be obtained from the Auctioneers' Office.

Auctioneers' Office: Exchange Walk, Nottingham. Tel. No. 46741. (F 509)

By Order of the Minister of Supply

G R

TWENTIETH IMPORTANT SALE

ELSTOW STORAGE DEPOT

4 miles South of

BEDFORD

(on the Bedford to Luton Road)

PEACOCK, MERRY AND SWAFFIELD

will Sell by Auction

from

MONDAY, AUGUST 21 to FRIDAY, AUGUST 25, 1950
(5 Days)

at 11 o'clock each day

approximately

1,400 MOTOR VEHICLES

including: 100 SALOON CARS, 8 cwt. to 10 ton G.S. Trucks (some Diesel engined), Dropside Trucks, Vans, Utilities, Trailers, Hydraulic Tippers, etc., etc.

Also

100 MOTOR CYCLES

and

20 FORK LIFT AND FACTORY TRUCKS

On view August 16, 17 and 18, 1950, from 9 a.m. to 4 p.m. each day. On Sale Days from 9 a.m. to 11 a.m. each day.

Catalogues: Price 6d. (P.O. only, no stamps). Admit one person on Sale Days. Two persons on View Days.

AUCTIONEERS' OFFICES: 10 LIME STREET, BEDFORD
Telephone 66366 (4 lines)

(F 523)

CABLES & WIRE

CABLE, 50,000 yd 19/052, by well-known makers, far below manufacturers' price.—Box No. 1585, Electrical Times. (F 554)

NEW CABLE

NOT War Emergency Grade

manufactured in 1949 by members of the C.M.A.-G.E.C., The Metropolitan, B.I.C.C, W.T. Glovers etc. 19/052 100vd. coils Red or Black 0·04. Single V.I.R. 250 volts sealed in makers' original wrappings.

£7

per 100 yds.

This cable is perfect, money refunded if dissatisfied.

H. J. BOULTING LTD., HAROLD ST. WORKS, AYLESTONE, LEICESTER. *Phone* 32279.

(F 555p)

DOMESTIC APPLIANCES

ALL types of IMMERSION HEATERS repaired; new reliable TUBULAR TYPE ELEMENTS fitted.—R. Hamilton & Co. Ltd., 27 Turner Street, Manchester 4. Tel.: Blackfriars 1744. (F 312)

IMMERSION HEATERS. Grubb 2 kW and 3kW standard voltages, all lengths, 12 in. to 36 in. Also 4kW (non-taxable), 16 in. to 36 in. Fully guaranteed and immediate delivery. For illustrated brochure, latest lists and trade terms write distributors, John Owner and Co., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

ENGINEERING PLANT & MATERIALS

ALUMINIUM ALLOY, new polished flat sheets, size 6 ft. by 3 ft. by 24 gauge, £9 15s. per dozen. Corrugated Sheets, 6 ft. by 3 ft. by 24 gauge, £9 9s. per dozen. All prices carriage paid. Delivery ex-stock.—Sawyers Manufacturing Company Limited, Bures, Suffolk. Tel.: Bures 351/2. (F 552)

CONVEYOR BELTING: reconditioned conveyor belting, all widths up to 30 in., delivery ex stock, guaranteed. Attractive reduced prices. All material sent for a week's trial.—Winlow Wilson (Worksop) Ltd., Watson Road, Worksop, Notts. (F 536)

LADDERS (wooden and aluminium, all types), Trestles, Steps, Handcarts, etc., from Ramsay and Sons (Forfar) Ltd., Forfar (Tel. 172). (C 603)

ONE small ELECTRIC FURNICE, 230 V, 11 amp, 2·5 kWs, 700c, for sale.—H. Bach, 95 Cobbold Road, N.W.10. (F 502)

WELDING PLANT, Several Motor Generator Arc Welders, single, double and multi operator up to 600 amps. Input 400/440 V, 3-phase, 50 c/s. Also several single and double operator portable oil-cooled transformer welders. All modern units by well-known makers. Attractive prices.—Full details, write: Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (E 111)

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B and H. (Nottingham) Ltd. 62
Baker Metal Stopper Co., Ltd. 68
Belling and Co., Ltd. 6
British Electricity Authority 31
British Insulated Callender's Cables, Ltd. 20
British Thomson-Houston Co., Ltd. 39, 72
Brook Motors, Ltd. 70
Brush Electrical Engineering Co., Ltd. 27
Burco, Ltd. 24

Cable Makers Association 30
Chloride Batteries, Ltd. 57
Cressall Manufacturing Co., Ltd. 4
Crompton Parkinson, Ltd. 41, 63

D.P. Battery Co., Ltd. 26
Dorman and Smith, Ltd. 8

East London Mica Works 66
Edwards, F. J., Ltd. 68
English Electric Co., Ltd. 1, 28

Ferguson Pailin, Ltd. 35
Ferranti, Ltd. 33
Fluxite, Ltd. 64
Foster Transformers and Switchgear, Ltd. 11

General Electric Co., Ltd. 44, 67
Grubb Engineering Co., Ltd. 18

Harboro' Rubber Co., Ltd. 22
Hardy and Padmore, Ltd. 12
Hart Accumulator Co., Ltd. 32
Hartley Electromotives, Ltd. 62
Heatrae, Ltd. 37
Henley's, W. T., Telegraph Works Co., Ltd. 45
Higgs Motors, Ltd. 10
Huwood Components, Ltd. 4

Imperial Chemical Industries, Ltd. 29, 69
Isenthal and Co., Ltd. 62

Johnson and Phillips, Ltd. 17, 61

Lancashire Dynamo and Crypto, Ltd. 40
Londex, Ltd. 68
London Electric Wire Co. and Smiths, Ltd. 55
Low, Duncan, Ltd. 60

Metropolitan-Vickers Electrical Co., Ltd. 25
Metway Electrical Industries, Ltd. 58
Metafiltration Co. Ltd. 60
Motor Rag Co., Ltd. 66

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Parmiter, Hope and Sugden, Ltd. 71
Partridge, Jones and John Paton, Ltd. 16
Pinchin, Johnson and Associates, Ltd. 36

Resinoid and Mica Products, Ltd. 64
Reyrolle, A. and Co., Ltd. 23
Rigby, John, and Sons, Ltd. 4
Runbaken, Ltd. 68

Sanders, Wm. and Co. (Wednesbury) Ltd. 18
Sangamo Weston, Ltd. 46
Santon, Ltd. 34
Saxonia Electrical Wire Co., Ltd. 64
Scemco, Ltd. 58
Scott, Hugh J. & Co. (Belfast) Ltd. 26
Scottish Cables, Ltd. 14
Siemens Electric Lamps and Supplies, Ltd. 13
Simmonds and Stokes, Ltd. 22
Simplex Electric Co., Ltd. 2, 15
Slaters Electricals, Ltd. 56
Smith Meters, Ltd. 42
Steel Company of Wales, Ltd. 19
Steel Equipment Co., Ltd. 12
Sterling Cable Co., Ltd. 7

Tarmac, Ltd. 5
Taylor, Tunnicliff and Co., Ltd. 21
Thorpe, F. W., Ltd. 18

Wakefield, C. C., and Co., Ltd. 3
Walter, D., and Co., Ltd. 22
Wandleside Cable Works, Ltd. 58
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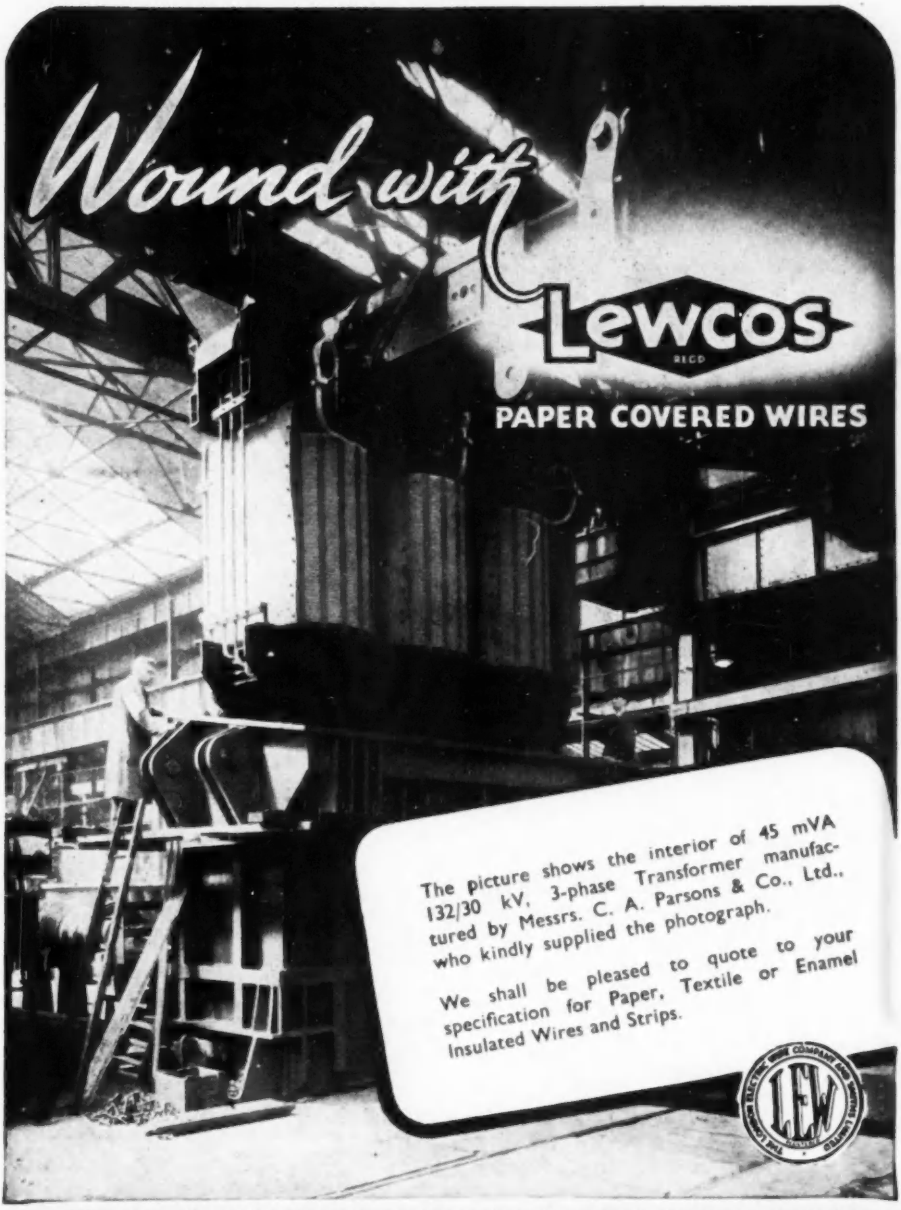
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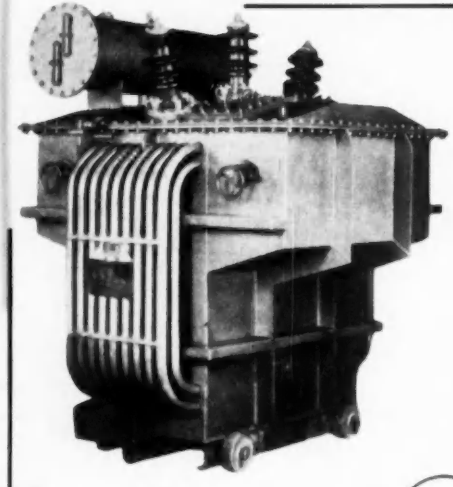

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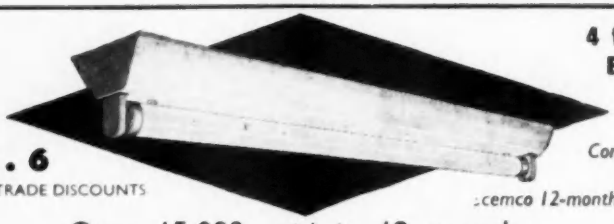

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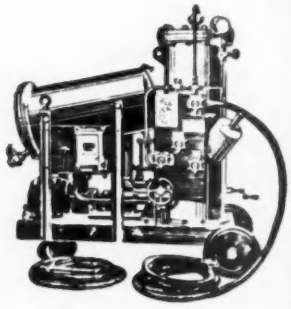

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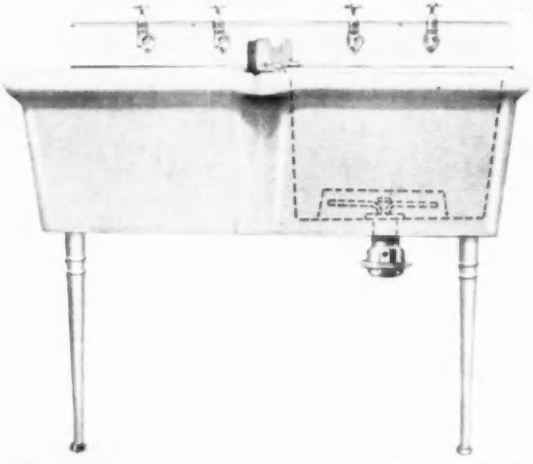

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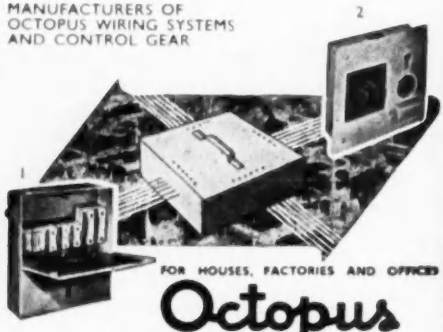

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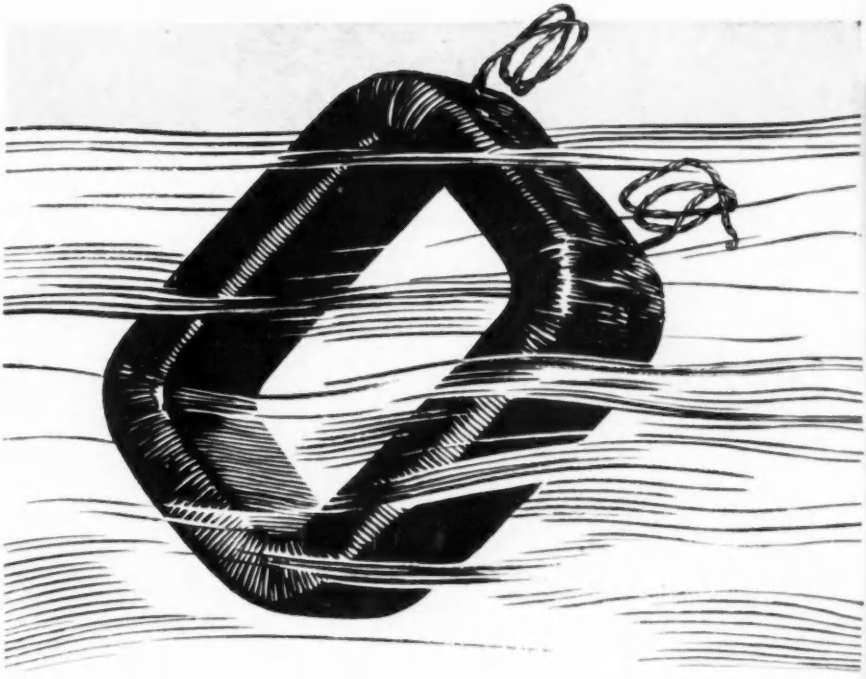

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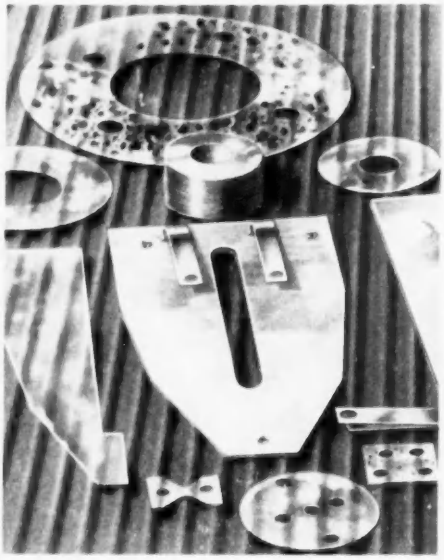

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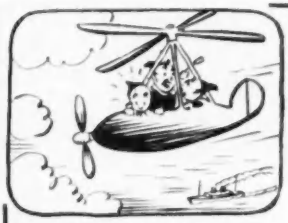

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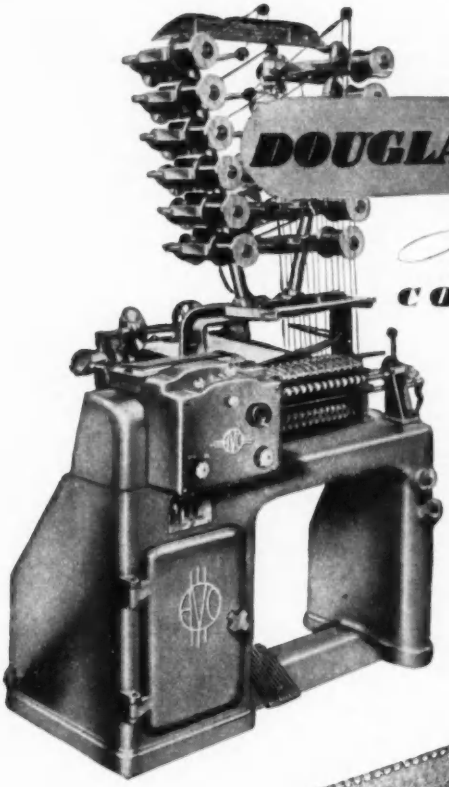

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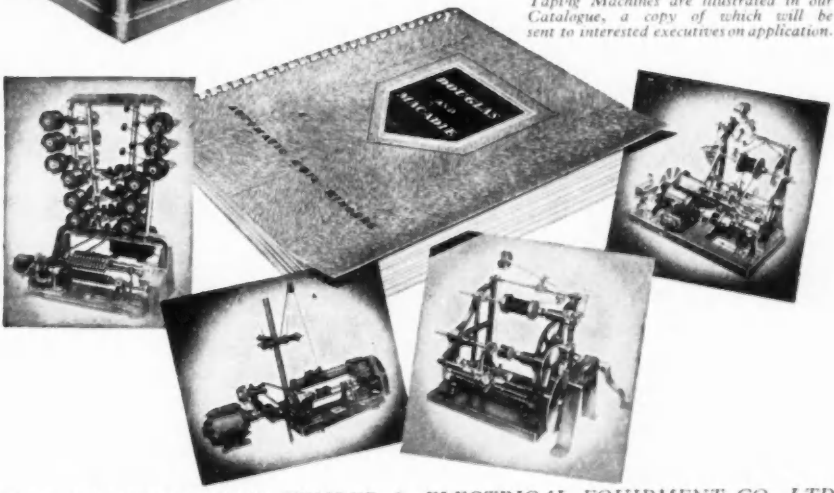

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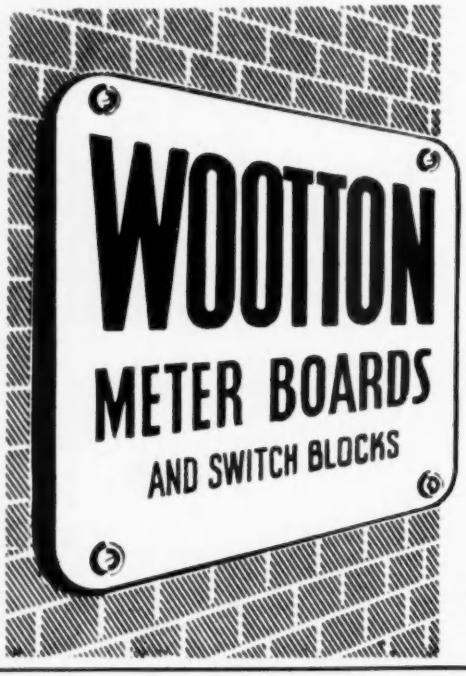

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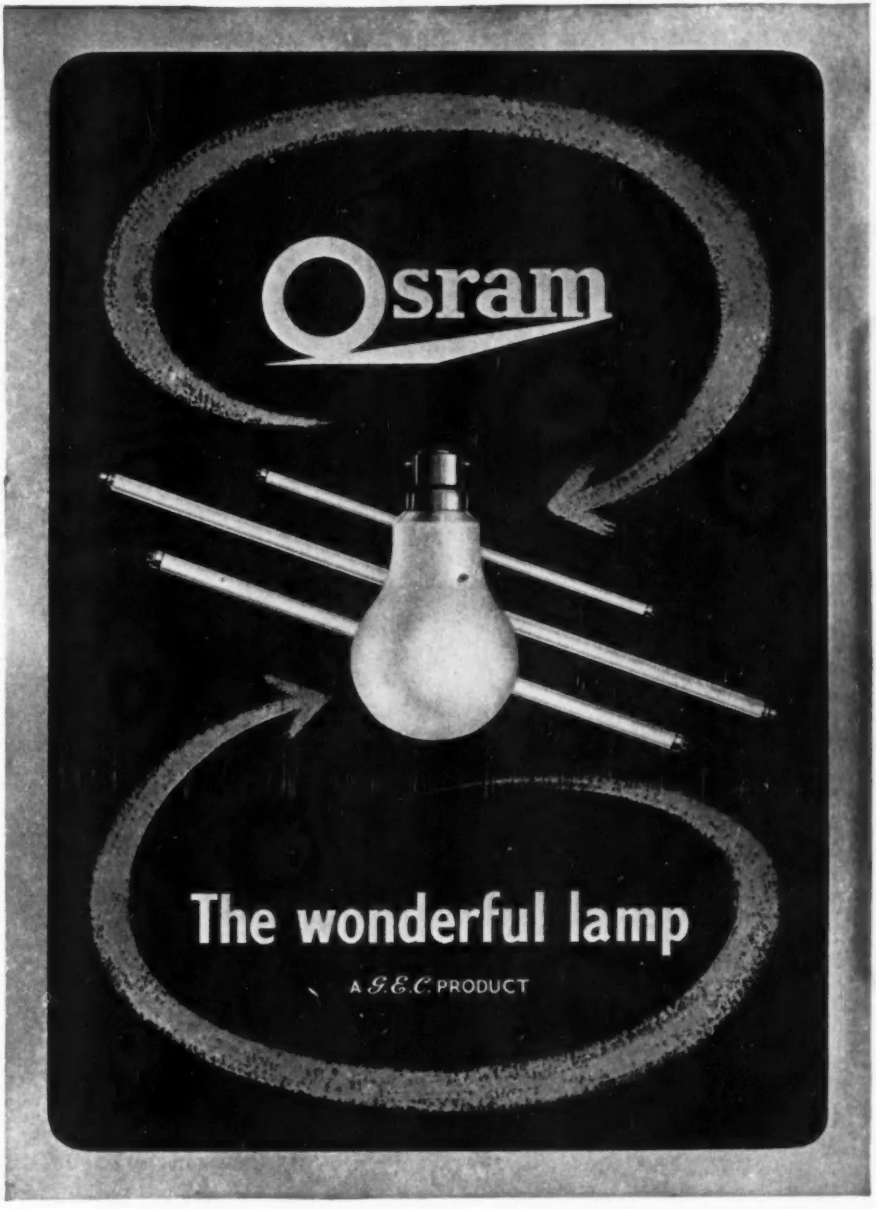

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